

BOREALIS

THE MAGAZINE FOR CANADIAN PARKS AND WILDERNESS

FALL 1988

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BOREALIS

The Magazine for Canadian Parks and Wilderness

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On the Cover

Photography by Wayne Lynch

The floor of the Boreal Forest is a veritable jungle of life. Among the most common but least known species are the mosses and lichens. Pictured are: the white ridged Studded Leather Lichen (*Peltigera aphthosa*), a favorite food of the Mountain Caribou: Knight's Plume (*Ptilium crista-castensis*), the moss with strongly patterned leaves; and the more common feather moss, *Hylacomium splendens*.

The Canadian Parks and Wilderness Society wishes to gratefully acknowledge the support of the Clifford E. Lee Foundation.

The Canadian Parks and Wilderness Society (formerly the National and Provincial Parks Association of Canada) is a private, educational, non-profit organization incorporated under Federal Charter in 1963 for the purpose of promoting the benefits and ensuring the protection of our great National and Provincial Parks, so that Canadians, as well as visitors to this country, may enjoy them in an unimpaired state for all time.

Specifically, its aims and objectives are:

- to seek the protection and conservation of lands and waters having unique or representative wilderness, ecological, scientific, recreational, or scenic value;
- to promote the wise use and enjoyment of Canada's national, provincial and territorial parks in a manner that will protect their integrity;
- to encourage public awareness and promote opportunities to inform and educate the public about the value of preserving park lands and water;
- to encourage and support research into the wise use, enjoyment, management and expansion of Canada's parks and other protected areas;
- to assist and co-operate with individuals, government and private organizations in conserving Canada's parks and wilderness.

MISSION

It is the mission of the CPAWS to promote the protection of national, provincial and territorial parks and other places of natural significance so that Canadians, as well as visitors, develop a personal commitment to, and enjoy and benefit from parks, wildlands and natural areas for all time.

The Society depends for support upon its members and upon grants from private and corporate donors. Membership classes are:

Student — 1 year \$17; Individual — 1 year \$23; Household — 1 year \$28; Life — \$500.

Other contributions and bequests are also needed. Donations to the Society in excess of the basic \$23 individual membership fee, which covers the cost of *Borealis*, are an allowable deduction for income tax purposes.

The Canadian Parks and Wilderness Society is a member of the International Union for Conservation of Nature and Natural Resources.

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SEPTEMBER 1988

La Société pour la protection des parcs et des sites naturels du Canada (anciennement l'Association des parcs nationaux et provinciaux du Canada) est un organisme Éducatif et privé sans but lucratif. Incorporée sous une charte fédérale en 1963, la Société a comme objectif la promotion des bienfaits découlant de nos parcs nationaux et provinciaux et la garantie de la protection pour que les canadiens et les visiteurs étrangers puissent en bénéficier tout en les conservant intacts à perpétuité.

Spécifiquement, la Société vise à:

- rechercher la protection et la conservation des milieux terrestres et aquatiques dont l'ambiance naturelle et/ou la valeur écologique, scientifique, récréative et esthétique est unique ou représentative.
- promouvoir la bonne utilisation et la jouissance des parcs nationaux, provinciaux et territoriaux de façon à ce qu'ils soient adéquatement protégés.
- stimuler la conscience collective et promouvoir les occasions d'éduquer le public sur l'importance de préserver les milieux terrestres et aquatiques des parcs.
- encourager et appuyer la recherche orientée vers l'utilisation, la jouissance, la gestion et l'expansion des parcs et des sites protégés du Canada.
- collaborer avec des particuliers et des organismes gouvernementaux et non-gouvernementaux pour conserver les parcs et les sites naturels du Canada.

MISSION

La Société pour la protection des parcs et des sites naturels du Canada se donne pour mission la promotion et la protection des parcs nationaux, provinciaux et territoriaux ainsi que d'autres lieux d'importance naturelle, pour que les canadiens et les visiteurs étrangers développent un engagement personnel envers ces territoires et tirent profit à perpétuité des bénéfices qui en découlent.

La survie et le dynamisme de la Société reposent sur la générosité de ses membres et sur les dons qui lui sont consentis par des individus ou par des entreprises.

Cotisations:

Étudiant — 1 an, 17.00\$; individu — 1 an, 23.00\$; famille — 1 an, 28.00\$; a vie, 500.00\$.

Tout don additionnel ou leg est aussi bienvenu. Les contributions qui excèdent la cotisation individuelle de base de 23.00\$, laquelle comprend le coût d'abonnement à *Borealis*, sont déductibles pour fins d'impôts.

La Société pour la protection des parcs et des sites naturels de Canada est membre de l'Union internationale pour la conservation de la nature et des ressources naturelles.

Borealis est publié quatre fois l'an par la
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A New Light Over the Land

It is a pleasure and a privilege to write this brief message for the premiere issue of *Borealis*. Three years in the planning, this magazine aspires to become a leading Canadian light in the global effort to seek better protection for the vanishing natural world.

The Canadian Parks and Wilderness Society realizes that we are a unique national conservation society and that *Borealis* too must be a unique publication to reflect our particular area of work and expertise. Unlike other environmental groups, our principal concerns and activities are focussed upon areas of land and landscape rather than upon individual species. Thus, since our formation in 1963 we have been on the leading edge of the national movement to designate protected areas as national and provincial parks and to assist governments in resisting the demands of groups and individuals who lobby to develop and destroy these precious natural ecosystems.

The launching of *Borealis* magazine is an historic and proud moment in the development and growth of the Canadian Parks and Wilderness Society. The Society's Trustees believe strongly that CPAWS needs an educational publication of this type in a popular format so as to enable us to reach the reading public with the message about the true worth of Earth's natural environments. We are committed to making a major contribution to stabilizing and reversing the current trend of destruction. By offering *Borealis* to Canadians, we also hope to invite ever more people to become members and to support the work we are doing.

On behalf of the Board of Trustees, I am delighted to welcome and introduce our editor. David Dodge lives in Edmonton with his wife and newborn son. The entire basement of their house has been turned into the national editorial office of *Borealis*.

Dave has a degree in forestry from the University of Alberta, Edmonton, where he took a greater interest in environmental ethics than in the production of fibre. His natural interest in photography, writing and the environment soon gained him a place on staff of the St. Albert Gazette, a weekly community newspaper north of Edmonton where he worked from 1978 to 1985 and where he gained a reputation as an environmental reporter.

In 1985 when the Alberta Chapters of CPAWS were looking for an Executive Director, Dave found himself with another challenging job but this time working full time for the environment. His efforts as editor of the chapter newsletter, and as a lobbyist and organizer are well known in Alberta. As the editor of *Borealis*, Dave will face an environmentalist's ultimate challenge: the creation and production of a highly respected and economically successful national publication in a rapidly developing and changing field.

Dave brings to the editorship of *Borealis* the cautious, trained and critical eye of a journalist, experience which I know will serve him and our Society to advantage. He is a distinguished photographer and is the recipient of several provincial and international awards for photographic excellence. Members can look forward to a magazine with some of the most outstanding photography which he and our many contributors can produce.

In closing, I would like to make a very special appeal to all members of CPAWS and all readers of this premiere issue. I urge you to become ambassadors for CPAWS by showing this copy of our new magazine to neighbours, friends and co-workers. In that way you can help us in a most vital way to achieve our objective of building a larger national membership so that we can better carry on our work for the protection of parks, wilderness and the natural beauty and ecological integrity of the Earth.

Ted Mosquin

Canadian Parks and Wilderness Society

La Société pour la protection des parcs et
des sites naturels du Canada

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Borealis Magazine

Box 1359, Edmonton, Alberta, Canada T5J 2N2
David Dodge: Editor/Redacteur

More than a Nature Magazine

Borealis was born on the shores of the Atlantic Ocean five years ago in Terra Nova National Park in Newfoundland. The concept emerged from a growing recognition by the trustees of the Canadian Parks and Wilderness Society, that there was a need to reach wider audiences with news, features and information about the environment.

For 23 years, the Society has published *Park News*, a quasi-academic journal inspired by the need to preserve intact parcels of nature across Canada. What the trustees realized, was that concealed on the pages of this now historic publication, were the words of some of Canada's most important minds, disguised in a form slightly beyond the reach of a potentially vast audience.

A recent article was innocuously titled, "Parks and Wilderness: Theory and Practice." Yet below this less than tempting headline were the words of Dr. Stan Rowe, one of Canada's eminent ecologists, widely respected by scientists — and potentially by all Canadians.

"Can you understand yourself apart from your ethnic group, your family, your upbringing, your cultural history?" Rowe asks. In answer he advises: "As earthlings, look to your beginnings, to your roots, to your natural history, in order to understand your needs, your nourishment, your health, your creativity, your sense of beauty."

Borealis is not a nature magazine. Rarely, if ever, will you find a story describing the biology of a spider or the nesting habits of the Hermit Thrush. These things are already very well covered in publications such as *Nature Canada*. But neither does *Borealis* seek to be only a reportage of the "evolving Canadian landscape."

Through the pages of *Borealis Magazine* you will encounter the deepest and most significant issues facing our time. And you will also be challenged to confront and evaluate your own place on earth.

The premiere of *Borealis* contains over 30,000 words from sources representing the geographical extremes of this nation; words not all of the same color. Some are from scientists, others are from grassroots people like you and I and still others come from the typewriters of some of the most talented reporters of environmental issues in Canada.

Borealis is for anyone who shares an interest, feeling or concern for the land.

Culture, Aldo Leopold says, is simply one of many implementations of the artifact known as civilization.

This is the wilderness, *Borealis* seeks to uncover, to understand and to report on. To reach beyond the traditional bounds of nature publications, we have drawn heavily from literature, the arts, people and imagery.

In the special report "Fifty Important Books to Conservation in Canada" we set out to discover what books have most influenced conservation in Canada and it should be no surprise that Aldo Leopold was the overwhelming favorite and the single most influential author uncovered in our survey.

It was for this reason that we have selected his classic essay, "Wilderness" and reprinted it in our Essay section.

Far too often, natural history is seen as something foreign. We are proud of heritage, and cultural history but natural history, that's something that applies to butterflies or natural features, such as mountains. Yet man is an animal, he is a living, breathing beast, a part of natural history.

Nevertheless, the environment is rapidly becoming one of the single most important issues facing our time. *Borealis* is your link to issues of wilderness and the environment. Let us know what you think, help us create one of the finest publications about the Canadian environment. As Henry David Thoreau said, "What use is a house if you haven't got a tolerable planet to put it on."



Borealis

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Letters



Saw-Whet Owl.

I am happy to hear about your new magazine and hope it will have enormous effect. It is difficult for the parks to survive in these days and we must all do all that we can.

Farley Mowat
Author

Borealis looks like a worthy and terrific project. I wish you the best with this, especially the enthusiastic support of a large readership. It does the heart good just to know that you intend to be there, addressing the most important issues of our time.

Barry Lopez
Author

I would like to congratulate the directors of CPAWS for taking on the challenge of *Borealis* magazine. While *Park News* has served us well, the range of topics and the editorial scope of *Borealis* promises us an important new voice for the conservation movement in Canada.

I look forward to the first and subsequent issues. Best of luck in your new venture.

Ken Walker
Co-operative Activities Co-ordinator
Western Region
Canadian Parks Service
Calgary, Alberta

Congratulations to the Canadian Parks and Wilderness Society on its 25th anniversary. I am pleased to see the Society start its next 25 years with the launching of a new magazine! Well done! As we all know, public education helps to generate political will. I am sure that *Borealis* will foster a new understanding of wilderness issues amongst Canadians.

Congratulations and best wishes.
Charles Caccia, M.P.
Davenport
Liberal Environment Critic

Bravo! I welcome the appearance of *Borealis* to the Canadian landscape, and congratulate her creators.

In its twenty-five years, CPAWS has witnessed too much destruction of Canadian wilderness, and too little creation of parks. Even now, our collective efforts can rarely conquer the influence of developers and industry over parks policy and land use.

Borealis is a major step forward. It will remind us of what we need to protect and foster — and what we stand to lose.

Best wishes.
Lynn McDonald, M.P.
Broadview-Greenwood
New Democratic Environment Critic

The very best of good fortune to you, and to *Borealis* — such a superb name!

John Livingston
Author

I welcome the advent of a new, beautiful and eloquent voice for wild Canada, and particularly its boreal regions. The cause of conservation and preservation in your great country can use more support, which can only be won through public awareness. I look forward to your premier issue and wish you tremendous success.

Les Line, Editor
Audubon Magazine
New York, New York

On the occasion of the premier issue of *Borealis*, I want to express my satisfaction that another voice for environmental protection has appeared in Canada, and I hope it will be strong and clear.

I am sure that the editors and staff of your magazine will work hard to maintain the high standards of environmental journalism that Canadians have come to expect. I will follow your future progress with great interest.

All good wishes.
Tom McMillan, P.C., M.P.
Hillsborough
Minister of the Environment

Taiga

Earth's Evergreen Mantle

*Article by J. David Henry
Photography by Wayne Lynch*



A person feels an intimacy overtake the land as one penetrates this gently-rolling, forested country. As the trees flash by on either side of the car, one sees a diminutive forest growing on small ridges surrounding pocket-sized meadows. Yet just as one is beginning to feel comfortable, the road breaks out on to the shoreline of a boreal lake and the vastness of the landscape stretches on forever.

The taiga, (pronounced TIE-gah) or boreal forest as it is called, begins on the island of Newfoundland and rolls across the continent in a wide swath of coniferous forest occupying much of northern Canada and central Alaska. Skipping over the Bering Sea the forest continues across Siberia and ends by occupying the greater part of Scandinavia. If viewed from a satellite orbiting high above the earth, the boreal forest appears as a dark green crown bedecked with glistening aquatic blue jewels, which seem to declare to the rest of the solar system, that this planet of ours is a haven for living organisms.

I have spent the last decade living in the taiga, coming and going about my business, travelling to different parts of North America, but always returning to the lush, fragrant balsam fir forests, which surround the northern lake where my family and I have built our home.

One of the deepest impressions of this land, which remains with me when I'm away, is that it's a place that offers a sense of solitude and privacy to a degree that I have never experienced in any other environment. Yet at the centre of this privacy and intimacy is a sense of menace, a dread of becoming lost in the intricate boreal labyrinth. It is the fear of becoming disoriented in the taiga that keeps most sensible people content to remain among the roadsides and hiking trails that tunnel up into the boreal forest.

To follow animal trails that braid and twist into the undergrowth, to follow creeks that merge and vanish into trackless muskegs, one must have an unusual appetite for the wild. So I usually stand on a lakeshore or hiking trail and peer into the unending taiga wondering what it is really like.

To know its personality, one must pursue it aggressively and unrelen-

tingly. It is a land that seems to demand that you become totally immersed in it if you are to know it at all.

It is not a land filled with static grandeur, such as the mountains offer. It is rather an unassuming wilderness, a land very content to be unnoticed but a land filled with process and change for those who have the eyes to see. It is at once a gentle yet brutal wilderness that stretches out before us.

An immense, gentle wilderness

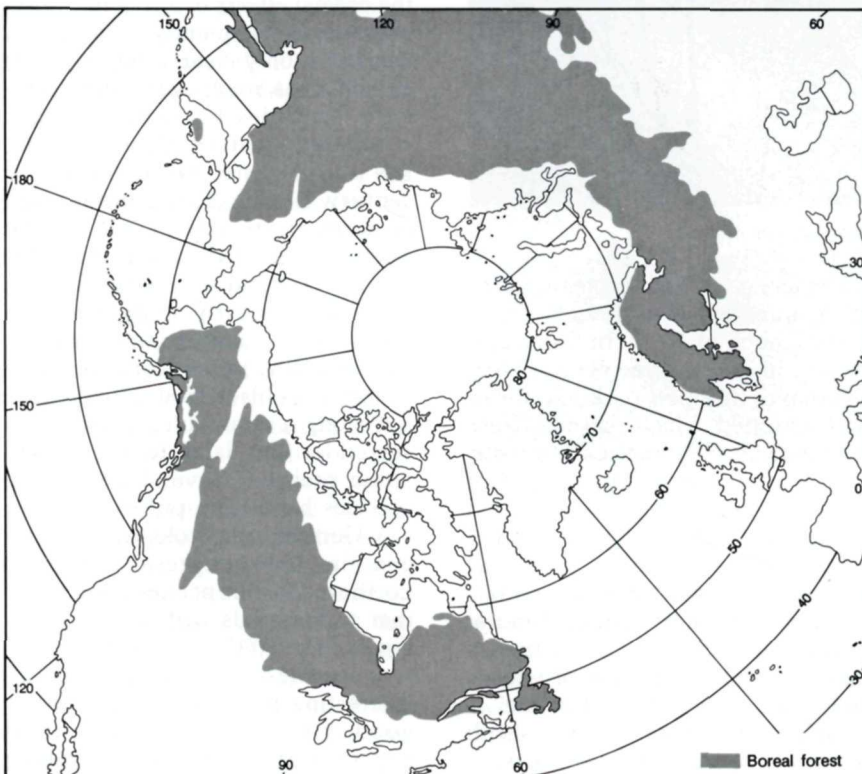
It is a good-sized crown for Mother Earth, twelve million square kilometres to be exact. And she wears it casually, jauntily cocked to one side as if challenging a fellow planet to try to knock it off. Warmed by the Gulf Stream surging through the North Atlantic and dumping eight million gallons of warm water along the coast of Scandinavia each hour, the taiga grows as far north as seventy degrees latitude in northern Scandinavia. On the other side of the Atlantic that would place you at the very centre of the Greenland ice cap.

In the middle of the continents, where the climates are chillier, this conifer crown is worn farther south. In North America, one finds the taiga as far south as northern Minnesota, along the north shores of Lake Superior and Lake Huron and throughout much of New Brunswick.

In central Asia, the taiga extends as far south as the northeast corner of Inner Mongolia. Here one can find a small group of orientals dressed in hides and living a nomadic existence as they move their semi-domesticated reindeer from winter to summer pasture in the low mountains of Inner Mongolia. These Ewenki people have developed a viable reindeer industry and show many striking cultural affinities to the Sami of northern Scandinavia and Finland.

This boreal life zone is called by various names: northern conifer forest, boreal forest, sub-Arctic, and taiga. These are synonyms for the same thing — the largest natural ecological zone found on the face of our planet. Taiga is becoming the preferred term for this immense biome. It is a Russian word originally used to refer to the dense marshy forest of Siberia.

Taiga has come to be an acceptable scientific term referring to the whole boreal forest zone. When it first came into western use some ecologists restricted its use, letting the term



*Wild Strawberries caught between the seasons in the boreal forest (left).
(above).*

Bald Eagle

taiga refer only to the northern treeline forest — the open park-like lichen woodlands that form the transition zone between the boreal forest and the open tundra. This was clearly not the intent of the original Russian word and this use has been rejected.

Taiga means boreal forest, from the northern forest-tundra border south to where the boreal forest turns the land over to grassland prairies or the eastern deciduous hardwood forests.

What is it like, this immense taiga as it drapes the head of the Earth proclaiming her to be user-friendly to the rest of the galaxy? Like all forms of classification devised by humans, the biomes of the earth are theoretical constructs; they are highly influenced by the way we perceive the world. If humans were three inches tall and burrowed through the earth, we might classify the life zones by taste rather than by sight. But even acknowledging these human biases, there does seem to be something that unites twelve million square kilometres of northern forest.

The taiga often feels the same no matter where on the globe it occurs. Professor William O. Pruitt, Jr. of the University of Manitoba has done research on various regions of the taiga over the past thirty-five years. He describes the boreal forest this way:

"Because the dominant trees are conifers, particularly spruce, the general aspect of the taiga is essentially the same wherever it is found — spire-like spruce against the skyline, with feathery larches, white-barked birches, dense stands of alders; together forming a mosaic pattern when viewed from the air. The climate, soils, plants and animals form an interacting fabric which is distinct from other associations adjacent to it. Although there are a number of important regional variations to the taiga, they are but phases of what is obviously the same biotic association." (Pruitt, 1978, *Boreal Ecology*, p. 35)

The taiga is the set of forest ecosystems that can survive in the North. The sub-arctic climate is so harsh that it induces primarily a conifer forest in the northern latitudes. From a composition standpoint, it is a simple forest. For example, across much of North America only eight tree species can be found in the taiga: aspen, balsam poplar, white birch, tamarack, black spruce, white spruce, jack pine and balsam fir are the tree species that can stand up to conditions of the

North. In the Nordic countries the taiga is simplified even further so that Scotch pine, Norway spruce and pubescence birch are the three tree species which dominate the taiga forest of Norway, Sweden and Finland.

Much of the variation of the taiga is found along its northern edge where the boreal forest finally gives way to the Arctic tundra. This forest-tundra transition zone varies in size in different regions. It is especially broad across much of northern Canada. It occurs in discontinuous patches across Alaska and is a narrow zone across Siberia and northern Scandinavia.



Harebells in Alberta.

The forest-tundra is protean, taking on a number of different forms. Across much of northern Canada, it grows in the form of a lichen woodland, an open park-like forest with stunted black spruce trees growing every ten metres or so, surrounded by a rich thick carpet of ground lichen with a few scattered ericaceous (heather) shrubs. In other areas the forest-tundra grows as isolated clumps of black spruce surrounded by large stretches of tundra. In still other areas the forest-tundra may be extensive stands of willow and dwarf birch so that "treeline" is actually formed by several shrub species covering immense areas.

In northern Scandinavia and Finland, a different form of the forest-tundra is encountered. Here the transition zone is formed by a

"mountain birch forest" — gnarled, stunted birch scattered a few meters apart with a rich ground cover of lichens, sedges and grasses. It is the prime winter grazing ground for the reindeer herds raised by the Sami. If one rises up through a hundred feet or so of elevation in the rolling mountains of Lappland, then the mountain birch forest gradually disappears and the land surrenders itself to open tundra. Krummholz birch trees scattered in a park-like manner at tree-line? It is a boreal variation that is just not encountered in North America.

The natural questions to ask are: What makes the forest-tundra finally give out and surrender to the open tundra? What causes the northern treeline? These questions may sound simple enough, but actually they're not. Let's consider why.

First, the whole concept of a northern treeline is useful only in certain areas. For example, consider the Mackenzie Mountains on the border between N.W.T. and the Yukon Territory. In this area it is difficult to attribute what is due to northern treeline and what is due to alpine treeline. In northern mountainous areas, they meld together.

Or consider northern Norway where three types of treeline are interacting: northern treeline, alpine treeline, and a treeline induced by the coastal effects of a cool maritime climate. Consequently, a northern treeline is only clearly developed in certain areas, for example, the Northwest Territories, but in these areas it is a distinct feature of the land that has intrigued naturalists for over a century. Reasonably accurate maps of northern treeline in N.W.T. have existed since 1845, when the great French naturalist Louis Agassiz published his early study of it.

But what causes this distinct treeline? Why in the Northwest Territories does black spruce finally give out along a convoluted border and surrender the land to the "great arctic prairie?" Several fascinating theories have been put forth.

A German climatologist, W. Koppen, in 1936, suggested that the northern treeline occurs along a line that corresponds with the northern limit of the 10°C (50°F) isotherm for the warmest month. It was an interesting hypothesis and a pretty good fit. Later, Nordenskjöld improved the correlation by taking into account not only the mean temperature of the warmest month, but the mean temperature of the coldest month as well.



Spruce forest in Prince Albert National Park, Saskatchewan.

R.J. Reed in the early 1960's built on this work but suggested an even more interesting theory. His hypothesis grew out of his research on the average summer positions of three airmasses: the Arctic, Continental and Pacific Airmasses. An airmass is a large region of atmosphere dominated by relatively homogenous atmospheric conditions. Typically the Arctic Airmass migrates south in the winter time and is the main cause of the frigid boreal winters.

During summer, it recedes northward and the taiga is covered by the warmer Continental and Pacific Airmasses, which give the region its brief warm summer. The belts of converging air where these three airmasses meet are understandably regions of unstable air, and, when these frontal zones or storm tracts are passing back and forth overhead in the spring and fall, the climate of the boreal forest is typically storm-ridden. Once one of the airmasses is solidly established overhead, we settle down into one of two stable boreal seasons — an indisputably frigid winter or a passably-warm summer.

Reed carefully documented the average summer position of where the Arctic Airmass meets the Continental and Pacific Airmasses. From his research, he concluded that the northern treeline coincides with the average summer (July through October) position of the Arctic Airmass. Boreal trees can grow this far north, but at about that point the

climate cools sufficiently so that the tundra prevails. Furthermore, Reed went on to show that, in areas where the boundary between these three airmasses occupy roughly the same position summer after summer, such as in lands west of Hudson Bay, the northern treeline is distinct and clearly developed.

In lands, such as Labrador and northern Quebec, where the summer positions of the airmasses are more variable, the northern treeline is not nearly as clearly delineated.

R.A. Bryson, employing airmass frequency analysis, took Reed's hypothesis even further. He agreed that the northern treeline is determined by the average summer position of where the Arctic Airmass meets the Pacific and Continental Airmasses, but he went on to suggest that the southern boundary of the boreal forest is determined by the average winter position of where these three airmasses rest. This hypothesis is a most interesting explanation for the northern and southern boundaries of the boreal forest. However, still needed is something which relates airmass movement to tree physiology. Why can black spruce not cope with the relatively cool summer air under the Arctic Airmass? Why does the frigid air under the Arctic Airmass in the winter favor the boreal trees rather than other tree species? Much research in this area still needs to be done.



Taiga at Mount McKinley, Alaska.

The Pre-cambrian cork

Having looked at the movement of air and how it might set the boundaries of the taiga, let's look at the stable rock below. In its circumpolar sweep, the taiga grows on many types of rock formations, but large stretches of the taiga occupy one of three types of geologies: Pre-cambrian Shield, sedimentary rock laid down in shallow seas, and mountainous terrain.

If the boreal forest is the crown for Mother Earth, then the taiga growing on the Pre-cambrian Shield is her royal emblem. The Shield with its countless, narrow pristine lakes dotted with thousands of islands is a landscape as breathtaking as any on earth. The ancient cliffs rising up to organize a distinct grain in the landscape add to its venerability.



Taiga in Wood Buffalo National Park, Alberta.

Where else can a father and his young daughter run their fingers across scars on bedrock and talk about the mile-high glaciers that made them? Where else can this seven-year-old girl line up her school of "rock turtles" and teach an imaginary class made up of pupils, all of whom are over two billion years old? Where else can a family, canoeing along the bare rock faces, search for stromatolites — cabbage-like fossils, deposits laid down by early algae, that are some of the oldest signs of life found on our planet.

The Canadian Shield boggles the imagination. It is a bizarre landscape, one where truth often turns out to be stranger than fiction. Yet it is a basic and essential landscape. To understand the Canadian Shield is to understand the primordial process which formed the North American continent.

The Canadian Shield and the other Pre-cambrian Shields located around the globe are made out of granites, relatively light stuff as far as rocks go. Granites are buoyant compared to basalts and many other kinds of rocks. Granite coalesces slowly, cooling out of the liquid magma, gradually forming over time so that the crystals in it grow large thus taking up more space and making granite buoyant.

The slow formation of granite is what gives it its relatively light density. Basaltic rocks are heavier; they cool and solidify more quickly, thus containing small crystals pressed together in a dense mass. Basaltic rock typically forms the ocean floors. Great masses of granitic rock float like huge blocks of cork in a con-



Taiga

At its southern extreme, the taiga adorns the rugged north shore of Lake Superior in Ontario. In Manitoba, a Common Loon rests on a lake, near the geographical center of the North American taiga. To many, the call of the loon is the most deeply penetrating symbol of the northern taiga.



In the far north of Alberta, fireweed and outcrops of the Canadian Shield produce a surprising view of the taiga.



White Pelicans look exotic in the froth of the Slave River in northern Alberta. A rare image of a Woodland Caribou in the taiga of British Columbia provides unusual evidence of diversity of this vast ecozone.



tinuous denser layer of basalt rock. Together they form much of the crust of the earth. These huge blocks of granite, these seven Pre-cambrian Shields located at various points of the globe, are the cores of the seven continents. They are what keeps the continents afloat as they bob along, suspended in the crust of the earth.

Scientists believe that originally when the granites of the Pre-cambrian Shields were first formed there was one huge continent, which Alfred Wegener, the originator of the Continental Drift Theory, named Pangaea (a Greek word meaning "all the earth"). Drawings of this ancient super-continent show South America nestled up to the coast of Africa and Newfoundland and Quebec snuggled up to Spain and England. But about two hundred million years ago Pangaea, because of the movement of gigantic plates underneath it, began to break apart. It broke up into seven distinct chunks, creating the Pre-cambrian Shields.

The Shields have drifted apart and have now come to rest usually where two tectonic plates meet and turn inwards towards the centre of the earth. The continents now bob like corks, caught in an immense eddy where the basaltic ocean floors are being sucked inward.

There have been other minor events over the past two hundred million years. Parts of continents have broken off and smashed into other continents, relatively minor collisions as far as Shields go. For example, the area we call India broke loose from Africa, migrated northward and collided with Asia. The dents and wrinkles from this collision we call the Himalayan Mountains. Granitic land masses have also migrated across the Pacific and collided with the west coast of North America giving rise to our western mountain ranges.

But rest assured, standing on the Canadian Shield our feet are on solid ground ... as solid as standing on a cork bobbing around in the eddy of a mountain stream. The Canadian Shield, the core of the North American continent, is nevertheless an immense area. It underlies most of the North American continent east of the western mountains. Only about a third of the Canadian Shield is exposed on the surface of the ground. This exposed bedrock forms most of Quebec, the northern portions of Ontario, Manitoba and Saskatchewan, most of the Northwest Territories and many of the Arctic islands.

Yet if the jewel-like beauty of the

Canadian Shield is not enough, if knowing that what the Shield is made out of is the roots of old mountain ranges (mountains that once stood higher than the Rockies), then perhaps one should ponder that this landscape is made out of rock that is billions of years old, with the oldest formations dating back almost four billion years, to the very dawn of this planet.

In certain places what we hike across on the Shield is the nearest thing that scientists can find of the original crust of the earth, those first granites that solidified out of our gaseous, molten planet. Some of the Pre-cambrian rock formed before the earth possessed an atmosphere, before things like oxygen and water were common commodities on earth, and eons before life forms were common on our planet. And these rocks continued to form and to be folded back onto themselves and melted down into new rocks over the next two billion years, or 80% of the whole timespan that our planet has existed.



A fern, north of Ottawa, Ontario.

It is a landscape whose natural history is extraordinary enough to challenge anyone's imagination. And yet Canada, a country blessed with an abundance of this sacred landscape — the core of the North American continent — has very few parks preserving the Canadian Shield. For most of us, it is just the "Canadian bush" — endless tracts of rock and stunted trees, an economic wasteland to be treated accordingly.

Perhaps it is time for a different perception of Shield country to arise in the Canadian consciousness. To my mind, the taiga and the Pre-cambrian Shield represent a special kind of ecological marriage, whether one is speaking of the gigantic Canadian Shield or the Baltic Shield, which forms much of Sweden and Finland, or the restricted Angara Shield found in eastern Siberia.

There is something stark yet inspir-

ing about the union of granite rock and spruce tree. It is a fascinating union, born out of bedrock and frigid boreal climate. It has a sharp angular beauty, a study in northern geometry. It has challenged generations of artists and writers. Stark images found in the writings of Chekhov are derived from this land, and the ominous landscapes a person encounters in the films of Ingmar Bergman come from the same source.

I remember how struck I was by the deep sense of harsh beauty and adaptedness the first time I ventured onto the Canadian Shield. I had lived and worked in the taiga, but always in regions where the taiga occurred on the Interior Plains. On the Shield I experienced a deeper sense of adaptation, a sense of rock and plant and animal fitting together. So many boreal processes seem to make profound sense when viewed on the Shield.

For instance, the suckering abilities of aspens as these trees slowly extend their margins out, creating their own microenvironments as they patiently extend their clones across the bare face of Pre-cambrian rock. So many aspects of the taiga ecology seem to make better sense when viewed on the Pre-cambrian Shield.

I have no idea whether there is anything scientifically valid about these canoeing ruminations of mine, these strong recurrent impressions that flood back over me whenever I venture into Shield country. Could a life zone, a biome, evolve highly under the influence of a particular kind of geology? Do the ecology and adaptive strategies of aspen, black spruce and other taiga plants make better sense when studied under the harsh, restraining growth conditions found on the Pre-cambrian Shield? If not, where does the balanced and manicured appearance come from when the taiga occurs on Pre-cambrian rock?

This special quality is no mirage, it is the essence of Shield country. It often takes the eye of the artist to capture this quality fully. The Canadian artist, Tom Thomson, pursued this quality throughout his short, productive life. His canvasses strived to express the deep, adapted beauty of Shield country, the northern geometry of a taiga landscape — a landscape which, if we listen, speaks deeply to the Canadian consciousness.

Adapted from the forthcoming book, *Taiga — Celebration of the Northern Forest* by J. David Henry, photographs by Wayne Lynch.

Boreal life

The Canadian Boreal Forest is of staggering proportions. It stretches across the nearly 10,000-kilometer breadth of Canada from Newfoundland to the westernmost borders of the Yukon, and ranges over 1,000 kilometers north to south.

At its southern most extension, the Boreal Forest reaches the north banks of Lake Superior in Ontario. But you will also find Boreal Forest up to a point just south of Tuktoyaktuk and the Arctic Ocean in the Northwest Territories.

Aurora borealis, the northern lights, which, for many Canadians, represent a kind of magic dance across the winter night sky. The result of interacting charged particles towed into elaborate formations by the magnetic poles, they work like giant flowing neon lights in the thin air of Earth's outer atmosphere.

In Latin, *Borealis* is feminine rather than masculine or neuter, and the Boreal Forest is mother to dozens of plant species which bear her name. The exquisite twinflower, *Linnaea borealis*, graces forested mossy banks from coast to coast. The bluebeard Lily, *Clintonia borealis*, a northern member of the lily family, raises its delicate head above damp areas near bogs and swamps across Canada. And the Northern Twayblade, *Listera borealis*, a small, intricately fashioned orchid, glorifies the floor of deep spruce and pine forests in the north.

The number of tree species is not high in the Boreal Forest; however, the diversity of bird life is spectacular. A close relative of the ubiquitous Black-capped Chickadee, the Boreal Chickadee, with its brown cap, inhabits northern conifer forests. And though the Eskimo Curlew, *Numenius borealis*, a species decimated by man, is now apparently extinct, the miniature Boreal Owl still sings its spring song like the ring of a soft bell. And from the very top branch of a White Spruce in northern Canada, the stately Olive-sided Flycatcher voices his often paraphrased warning: "Quick, three beers." The Red-tailed Hawk, Northern Flicker, Black Swift, Northern Shrike, Arctic Warbler, Cory's Shearwater, and the Common Eider, too, carry the subspecies name *borealis*, denoting their home.

A song of a different kind rings out from many thousands of sloughs across Canada — the familiar croaking of the Boreal Chorus Frog. Boreal Toads, too, are common on the fringes of lakes, just after the sun goes down.

Even in the world of butterflies, you find Labrador Skippers and Pearly Eyes, both *borealis* subspecies.

Among the smaller mammals are the Boreal Red-backed Vole and the Northern Bog Lemming, *Synaptomys borealis*, a cousin of the famed Brown Lemming whose mass migrations in times of abundance capture our

imagination. Even among flying mammals we find namesakes, such as the Red Bat, *Lasiurus borealis*. And the Northern Right-whale Dolphin, *Lissodelphus borealis* and the Rorqual (Sei Whale), *Balaenoptera borealis*, are among several sea going creatures which adopt their names from this great ecosystem.

But it is in the dead of night, while the northern lights are still dancing across the northern sky, that another most significant member of the Boreal family becomes apparent. *Borealis* is the north star which guided early mariners and explorers across the chartless seas and continents for centuries.

For many people, the word Boreal simply means "the north." But no matter how you look at it, the Boreal Forest describes what most of Canada is. It represents the largest ecosystem in the nation, the largest collection of interacting nature in this country. From the fragility of the beautiful twinflower to the seemingly inconceivable extent of the Boreal Forest itself, it is our most pervasive influence and inside its web of life is the key to the health of an environment which nurtures and provides for our existence with water, wildlife and even a stable continental climate.

Ted Mosquin

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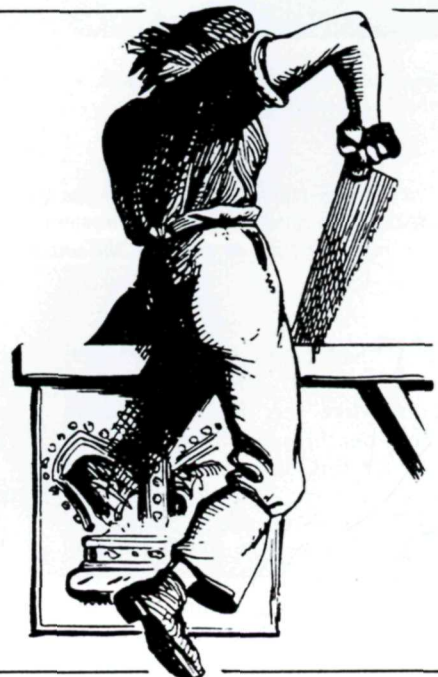
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South Moresby by Kayak

Article and Photography by Thom Henley.



Thomas Dix of Masset, B.C. beaches his kayak at Ninistints, an ancient Haida village and a World Heritage Site (above). 'Haida Gwaii' (South Moresby) bombards the senses with a dazzling array of natural history (right).

When Thom Henley kayaked into the Queen Charlotte Islands of Canada he had no idea that his romance with these mysterious isles and the Haida culture would compel him to rally a nation to preserve the unparalleled beauty of South Moresby.

The Pacific rose and fell beneath me, its rolling rhythms like the breaths of some ancient deathless creature. At each crest, fleeting visions of the land beguiled the eye — a tantalizing montage of haze-cloaked bays and islands, toned in the primeval greens of virgin rainforest. Then the creature breathed again, and the siren vistas vanished, as the kayak surged down into the wave's chill

blue-grey depths. The sight line with the land was severed, and the solitude was suddenly overwhelming.

And so it continued for hours ... an exhilaration checked by reservation; an outreach, then an introspection. On this solitary journey by kayak each wave became a mood, alone, to "Gwaii Hanas," the "Islands of Wonder."

It was summer solstice, June, 1973,

when I first set off in my 16 ft. canvas kayak on the three week voyage to the southern islands of the Queen Charlotte Archipelago. I had paddled thousands of kilometers by canoe and kayak in the lakes of the Canadian Shield and the arctic rivers of Alaska and the Yukon, but only recently had I felt the power of the ocean beneath my craft.

Had I a way of knowing that this voyage would change my life, perhaps I would have turned back — perhaps that four-meter sea would have been too powerful an opening statement, too intimidating an introduction. But there was something more here, something



becoming, some strange lure calling me south to the isolated extremity of an already remote archipelago. The thrill of discovery was tempered by a good deal of uncertainty.

Like the ancient Haidas who had come here by sea before me, and the many who have come after, I was quickly enthralled by South Moresby's islands of natural wonder. Here was the quintessential North Pacific wilderness — primeval forests, dark and brooding, dripping in moss in every shade of green the natural palette has ever mixed. Hundreds of islands extend for 100 kilometers along the very edge of the continental shelf. Snow-capped mountains thrusting from the sea floor, crystalline fresh water lakes, sandy beaches, hidden lagoons, bays, headlands and the rainbow beauty of the intertidal zone stagger the eye. High in alpine gardens, flowering plants, unique in the world, flourish in the misty maritime climate. The world's largest Black Bear roams the shores, its powerful paws casually toppling boulders in search of Purple Shore Crabs. Restless, it prowls the creek mouths impatiently awaiting the return of the salmon. Whales and porpoise, seals and sea lions thrive in the protein-rich waters offshore. Bald Eagles and Peregrine Falcons nest here in the highest densities found in

Canada and more than a million seabirds: murrelets, auklets, petrels, gulls, cormorants, puffins, murres and guillemots congregate in huge, floating rafts that break away from a passing kayak like waves from the bow of a boat.

This natural tapestry is interwoven with a rich cultural thread. There are ancient Haida habitation sites with their ghostly weathered totems carved in huge Buddha-calm images that have been staring out to sea for a century or more. The skeletal remains of longhouses settle back into the earth under a funeral garment of moss. Secret and sacred shaman burial caves, forest utilization sites, rock fish weirs and launch ways for dugout canoes are silent witnesses as to the vibrant culture which flourished here.

That first intimation of ancient Haida life has an evocative power that subtly surpasses more highly colored memories. One feels the power of such a place long before you arrive. Drum songs appear as whispers on the wind — like hypnotic suggestions — then disappear. Without realizing, you find yourself kayaking to the rhythm of paddling chants singing songs you cannot translate. Orcas surface in front of the craft, and they appear to have too many dorsal fins. The mind calls up

the dreaded "Scanna," the five-finned killer whale, breaker of canoes, feared supernatural one.

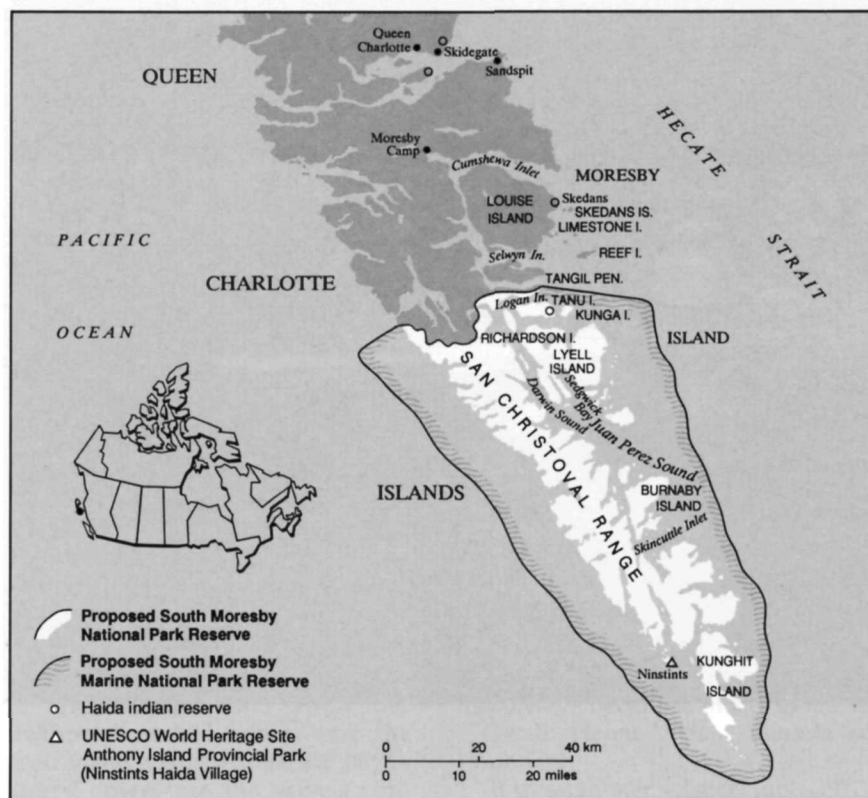
Once ashore there are more distortions. Shadows of people among the poles; children laugh and dogs bark. You almost hear the roll of gravel on the beach as though canoes are being launched. Nights are dark and heavy with noises. Dreams are eerie and unusually vivid. As much as you convince yourself that you are alone, you know you are not.

The reverence for life practiced by the people who once lived here is all around. The forests still thrive — lush and verdant. Clam beds spout with millions of miniature geysers at low tide. Salmon choke the rivers in their drive to renew life. Branches bend, weighted with ripe berries and flocks of waterfowl and seabirds can still block the sun with their passing. The land, the sea and the sky pulses with life.

This is no accident. It is rather a legacy of stewardship — countless generations of caring — a philosophy of love for the earth and faith in the future. It represents sustainable development in its truest, most time-honored form.

After you paddle away from these villages and leave the silence to heal itself, the haunting memory of the totems — men's work being reclaimed by nature — does not leave you. The lesson lingers on long after the images fade. As you drift silently over the galaxy of lavender and ochre starfish, green anemones and blue mussels of the low tide zone, the schism of maternity is gone. You are what you see. There is a union of spirit as you pull a gasping halibut into your boat with a jig line. You feel the heartbeat of the tree, its sap pulsing through the 16 ft. diameter trunk as you sleep beside it at night. Understanding displaces remorse as you watch the Storm Petrel, only moments before dancing over the water on winged feet, now securely clutched in the talons of a fleeing falcon. The connectedness of all living things becomes the primal lesson.

It was on my return north from that profound first sojourn into South Moresby that events were set in motion that would alter my life and demand more than a decade of commitment to a cause. It began with an eagle I found recently dead in Windy Bay, July 9th, 1973, and a chance encounter with Percy Williams, Chief Counsellor of the Skidegate Haida, later that evening. Somehow the two events appeared important in both of



our minds as we looked out from Vertical Point over a moonscape denuded by logging on Talumkwan Island. Fifteen months later we met again. Percy had been working diligently to persuade the B.C. Government to defer logging from Burnaby Island. Meanwhile, Percy's nephew, Guujaaw and I had been busy drafting the South Moresby Wilderness Proposal to protect the entire area south of Talumkwan Island.

It was the beginning of a movement that would culminate in the largest conservation battle in Canadian history, a battle which would ultimately involve 3.5 million supporters, heads of state, joint resolutions before the U.S. House and Senate and a rare, unanimous call for preservation from the Canadian Parliament. It would require the arrest of 72 Haidas in peaceful defence of their homeland and a price tag for compensation to the timber companies that would exceed that of all previous national parks. The result would be regarded worldwide as "the jewel" in Canada's crown.

During that struggle of 13 years, memories of those journeys by kayak to South Moresby were my touchstone, bringing renewal, new vigor and fresh dedication to the cause. Such is the spell of "Gwaii Hanas" that visitors today, even as part of large, organized tours, come away profoundly moved. And it is not surprising. Few places on this living planet combine the wilderness, cultural, wildlife and recreational features found here. By combining these features with the intimacy of travel by kayak and the insight which comes through solitude, these "Islands of Wonder" provide an experiential dimension which cannot be matched.

One must not venture into this realm, however, inexperienced or unprepared. Pacific disturbances can bring on storms with alarming swiftness. Tidal fluctuations are the largest on the Canadian Pacific and wind and wave action (particularly on the west coast of Moresby) give it dubious distinction as Canada's "highest energy coastline." The world's best rain gear will inevitably prove inadequate and the "Misty Isles" are sure to wash the city off of you in no time at all.

Permission must be obtained from the Skidegate Band Council prior to visiting old village sites and regulations governing the new National Park Reserve must be carefully



Returning from a kayak trip into 'Haida Gwaii,' Shirley Adams of Masset, B.C. is dwarfed before the pillars of Pillar Bay in the Northern Queen Charlotte Islands.

observed. But once properly prepared, and having cleared Haida Customs, you will embark on a journey of mind, body and spirit unlike anything you have ever experienced.

There are as many moods as there are hidden lagoons in this archipelago of ever changing beauty. The land bombards the senses: the fragrance of cedar and lodgepole pine wafting out over the water as the evening breeze shifts seaward; the pungent aroma of seabird isles whitewashed in centuries of nutrient-rich guano; the fragrance of seaweed at low tide, or the more subtle bouquet of heather, saxifrage and Shooting Stars in an alpine garden.

The sounds are no less pronounced: the explosive and unexpected blast of a whale breath, the incessant bark of seals and Steller Sea Lions covering the rookeries in their multitudes, the cry of eagles and the screech of falcons, the din of millions

of seabirds, the song of the waves, and always, the whisper of wind soughing through the treetops.

There are the touch sensations, too, such as kelp bulbs gently massaging the hull of your kayak as you slowly pass over their floating stalks. There is the ever present freshness of sea spray — cold and salty, fog and rain, the bite of wind and, every so often, the warmth of sun on hands and face. There is the embracing touch of the forest floor as you sink deep into the world's most luxurious moss bed; the numbing tingle of a shower under a snow-melt waterfall, or the deep, soothing heat in a near-boiling mineral spring.

Here the eye is king. To paddle silently over the satin surface of Juan Perez Sound while dawn blooms through a dense Pacific fog bank, engulfing the San Cristoval Mountains and pouring rivers of mist down through the mystic blue hanging valleys is an experience of sublime wonder. And it is more than an optical feast. "Gwaii Hanas" soothes the very soul.

Later, there is silent night paddling in a phosphorescent sea where the dip of the paddle ignites a million diatoms, fires that dance in the swirling void of the sea as the stars in the black velvet sky. Horizons blur and merge into one firmament. A jet trail of blue/white phosphorescence trailing behind your craft is the only clue to the swiftness of your journey. At last, the craft becomes the sea; the traveller becomes the travelled, and there is the ultimate wealth of oneness.

Thom Henley at the Windy Bay Haida Longhouse.



White Bears, Solid Stirling

For a man who has had his hand stuck in the jaws of a Polar Bear, breaking through the iron curtain is no problem.

Article by Ed Struzik



Through his research, Ian Stirling has drugged thousands of Polar Bears. Not one has died as a result — a record he is proud of.

When Canadian Wildlife Service scientist Ian Stirling got his hand caught in the clenched jaws of a tranquilized polar bear, he didn't know what troubled him more: how he would retrieve his bleeding hand before the bear woke up, or how he got himself in the predicament in the first place.

"We were testing a drug that we thought might work as an antidote in reviving tranquilized bears," said Stirling. "It's a concern because the longer a bear's out, the greater the chance of it overheating. And the more it overheats, the more unpleasant it is for the animal. There is also a chance that we might lose it."

So Stirling and Malcolm Ramsey, a graduate student at the time who now teaches at the University of Saskatchewan, injected a small

amount of the antidote into the bear's tongue and stood a good distance back to observe what would happen. Nothing did.

Stirling's next move was to pull the bear's tongue and check for resistance — a standard procedure for testing the bear's recovery.

"When you do this, you hold the upper jaw just behind the nose and lift," Stirling says, in such a methodical way that you fear he might ask you to demonstrate the procedure afterwards. "Then you reach in with your free hand, just behind the large canine teeth, grab the tongue and give it a couple of tugs.

"If the bear pulls back, that means it's waking."

This bear gave no response.

A few minutes later, he tried again,

fully expecting no reaction. This time, he made the mistake of reaching into the mouth from the front. Sure enough, just as he was feeling for the tongue, the jaws snapped shut, forcing the sharp incisor teeth to puncture through his hand.

"With his eyes becoming ever more alert and fixed on me, he hung on," Stirling says, with only a mild realization that this might be entertaining the listener. "There was no doubt that the antidote was working!"

It took several hard slaps on the bear's nose before Stirling and his colleagues managed to pry him loose. He escaped with no bones broken and only a slightly wounded ego. The bear eventually recovered and sauntered off.

It's a fantastic story, but not implausible given the fact that Stirling has worked on thousands of polar bears in his 18-year career, studying the animals for the Canadian Wildlife Service.

What is implausible, but true, is that neither Stirling nor any polar bear in the Canadian North has suffered anything much worse than what occurred on that day.

It's a proud record for a man described by his colleagues as a workaholic, a perfectionist, and a man who is absolutely absorbed by the animal that he studies. But it's just one of a long list of credits that makes Stirling the world's most prominent scientist in the field.

In the autumn of 1988, Stirling takes that reputation with him to Russia where he will represent the Canadian polar bear technical committee and chair the international body that oversees management of the polar bear in the circumpolar world.

It's the first time the Soviets will be hosting the conference. Another symbol of glasnost, perhaps, but Stirling and his colleagues broke through the Iron Curtain as early as 1973, with a management agreement to protect the polar bear. It was, and still is, the only international agreement on anything that has to do with all of the Arctic countries.

It is for that reason, and for the hard work that has gone towards making the agreement work, that polar bears have come from being an animal thought to be headed for extinction in the 1960's to one which is, in Stirling's own words, "in pretty healthy shape right across the Canadian Arctic."

In the recent decade, wildlife managers have struggled, often bitterly, with native hunters in an effort to get them to reduce their harvest of caribou, salmon, whales and other animals. But polar bear scientists and wildlife managers in the Northwest Territories have managed to avoid the confrontations.

In 1986, hunters from a number of Baffin Island Inuit communities voluntarily cut back on their hunting quotas in response to data, which indicated that the polar bear populations may be diminishing. Clyde River and Broughton Island alone reduced their annual take by two-thirds.

The Inuvialuit of Canada's Western Arctic took similar research data from Stirling and his research associates to the Alaskan Inupiat of

the North Slope borough and convinced them, despite the fact that there was absolutely no legal obligation for them to do so in the United States, to restrict their hunting practices.

"You put responsibility for the success of polar bear research and conservation on one man's doorstep," says Ray Schweinsburg, the Northwest Territories' former senior polar bear biologist. "I don't think there's a single scientist I know that has or deserves more respect from his graduate students, his Canadian colleagues, or the many people that he has worked with internationally."

There are, according to Schweinsburg, two kinds of scientific thinkers — the problem solver, the person who can put out the brush-fires, and the strategic thinker, the person who can see the big picture and apply their research towards it.

Ian Stirling is that rare individual who is both, says Schweinsburg.

He is also a man who is not content with pursuing the status quo as his work with Dr. Ralph Nelson of the Mayo Clinic in the United States demonstrates. With Malcolm Ramsey, who was the brainchild behind the idea, Stirling and Nelson are collaborating to solve the mystery of how the polar bear can biochemically activate the hibernation response while it is still active, thus allowing for the utilization of body waste. If the same mechanism can be induced in the human body, it could do for ailments such as anorexia nervosa, obesity and kidney disease what insulin did for diabetes.

Stirling has also contributed to the development of better construction footwear (the polar bear paws have a superb non-slip tread that allows them to move deliberately across the sea ice) and to studies which have helped determine how pollution from the most densely populated industrial areas of the world is affecting the fragile Arctic ecosystem.

"I'd be pretty thick between the ears if all I did for the last twenty years was stick tranquilizers in polar bear bums," he explains.

"I also have to keep my graduate students happy. These are some of the smartest people I've ever met. They're just too bright to be content with doing the same thing over and over again."

Last year, Stirling tackled one of the biggest challenges facing all scientists — he wrote a popular book that, in the words of a friend who encouraged him, "you don't need a degree in biology to understand."

"My primary motive was to educate people," said Stirling. "I essentially wanted to write a readable reference book for anyone who wanted to know anything and everything about polar bears, whether they be school kids or teachers looking for reference material." The book, however, promises to be much more than that. With numerous anecdotes describing various chapters, including a chapter on how scientists study polar bears (i.e., the biting polar bear incident), the book promises to excite as much as it aims to educate. Illustrated with photographs by Dan Guravich, an internationally acclaimed photographer with a special affinity for polar bears, the book is due out in Canada this autumn.

Another milestone, however, will not dampen Stirling's enthusiasm for studying the polar bear. The research will continue, he says, with the expectation of new challenges down the road.

"No matter how many times I've worked with these animals over the years," says Stirling, "I just never get tired of them. They have the capacity to amaze you, so you never get bored."

"There is just no way we observe everything the animal does in the wild. What they do out there on the ice for much of the time is mostly a guessing game to us. But you see them out there, where no other animal is capable of surviving on its own, including man, and you learn something new each time."

"It takes you back again and again."

Ian Stirling.





DAVID DODGE

Madawaska

A Land Ethic in the Making

Article by David G. Dodge
Photography by Harry A. Thomson

Low clouds brushed the treetops, dropping sporadic mists of rain, as Ted Mosquin stepped nimbly down the short trail to the banks of the Mississippi River.

"This is not typical," he assured me with a smile. For a full month Lanark County, just southwest of Ottawa, baked under a drought, but that day the dark rain clouds shared the sky with light, puffy cumulus, and it was enough to make you think you might be standing in a coastal rain forest somewhere in British Columbia.

The illusion fades quickly, however, as you look around. Here Sugar Maple, beech, and Red Oak stand alongside Basswood, Big-toothed Aspen, Eastern White Cedar and Eastern Hemlock. There are White and Yellow Birch here, too, and dozens of other species of trees. Nowhere else in Canada, except the Eastern Deciduous Forest, would you find so many tree species growing together in a symphony of life. Orchestrating this are climate, geology and a more recent player, acid rain. Although unusual in eastern Canada, the Mississippi River bed is limestone, a natural neutralizer of acid rain.

A Great Blue Heron takes to wing from half a kilometer down river, as if to symbolize the powerful immunity granted by the limestone. An Osprey calls out as if to verify it. The Mississippi is still a good place to live and hunt, the fishing hawk seems to say. Yet the heron and the Osprey



Ted Mosquin at his home near Lanark, Ontario.

would be hard pressed to survive on hundreds of other streams and lakes of southern Ontario where rising acidity has virtually eliminated fish populations.

Lanark County is almost European by design. It is what the British might refer to as "the countryside." Small one- or two-industry towns dot the map, and regional tourism and the small logging operators fill in the gaps. Lanark itself is home to the Kitten Factory (a clothing manufacturer) and the Balderson Cheese Factory, which has a reputation that extends well beyond the region. The villages and the century-old buildings you find there are well kept, providing the whole county with a quaint appeal.

Perhaps it is this quaint appeal that in recent years has attracted an influx of city folks who have set up homes

in Lanark County. Some commute for as long as an hour and a half to jobs in the nation's capital, Ottawa. Almost 200 years ago, in 1819, the first settlers came to Lanark County to set up homesteads, but most found the soil too thin and all that is left of that era now are a few scattered buildings and old split-rail fences made from White Cedar.

"Lanark County is symbolic of one of the better places to live in Ontario," says Ted. Driving down one of many county roads, it is imminently apparent that this beautiful countryside does possess a powerful appeal.



Today he is on his way to the Madawaska Highlands, an area which extends from the more remote northwestern corner of Lanark County on into Frontenac, Renfrew and Hastings counties.

If you stand on a hill tall enough, the Madawaska Highlands appear carpeted with maples, oaks, and White and Red Pines. Spectacular lakes are dominated by rocky outcroppings of the Canadian Shield. You wouldn't call them mountains; but hike to the top of a hill. The



The Madawaska River attracts canoeists from all over Ontario.

views are an important part of the glory of the highlands and a deviation in Eastern Ontario.

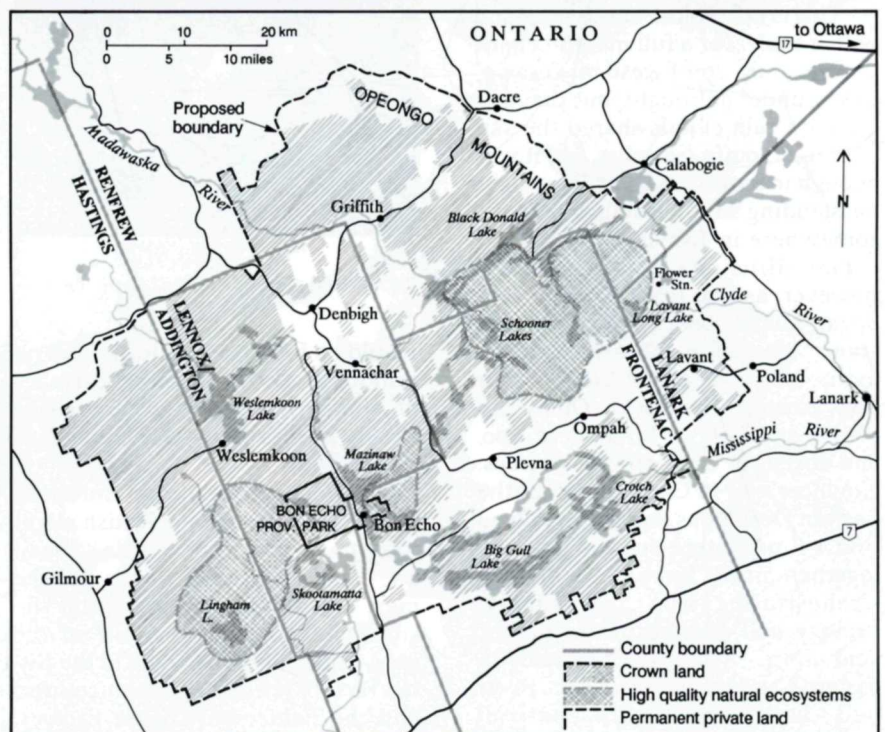
Although it is not a place untouched by the hand of man, much of the evidence is gentle by comparison with other places in Ontario and the rest of Canada. Since no one industry has tended to dominate the regional economy of Lanark County, the economic and environmental influences have been in relative harmony with the easy-going, countryside lifestyle.

Today in Madawaska, you can still find straight and tall 150-year-old White Pine, once prized for the masts of British warships.

Almost by coincidence, Ted Mosquin has found himself in the middle of a different type of war, right in the middle of his own County of Lanark.

In May, 1987, the Ministry of Natural Resources (MNR) released the Lanark Timber Management Plan.

"When we first twigged on to the



timber management plan, we went down to the west Lavant area to see what it looked like, and we were so surprised. It was so beautiful and right here in Lanark County. And low and behold, we saw five Red-shouldered Hawks, a nationally rare species, near west Lavant Lake. It

was providential. As it turns out, the Lavant Long Lake area is some of the most important habitat in all of Canada for this rare hawk, which has been all but eliminated in many areas of Ontario.

"They require canopied deciduous forests for nesting. Only two nesting



Almost two centuries ago, settlers came to the Madawaska Valley to set up homesteads. Many found the soils too thin and today agriculture plays only a minor role in the area.

records of the Red-shouldered Hawk have been recorded in Quebec, and it's not found in Algonquin Park, northwest of here."

In response to the Lanark timber management plan a group of local residents formed the Madawaska Committee, which coalesced around Ted Mosquin, the national President of the Canadian Parks and Wilderness Society (CPAWS). An energetic group of volunteers including such people as Ian Davidson, Connie Downes, Heather Dewar, Glen Pearce, Kay Cartwright and Alexandra Mosquin have worked tirelessly conducting reconnaissance trips into the Madawaska, speaking to local groups and lobbying government.

In June, 1987, the committee released its own ecological assessment of the logging plan. It sharply criticized the plan's call for "virtually 100 percent of all forested areas ... to be logged." Ecological values are wholly absent from the plan, claimed the report.

The critique pointed out specific flaws in the timber management plan and accused the MNR of managing

only for timber cutting. The report called for the protection of 25 square kilometers in the northwestern corner of Lavant County.

At 56 years old, Ted Mosquin has reached comfortable plateaus in several careers: an accomplished scientist, a botanist, ecologist and conservationist, but he is perhaps most widely known for his work as the founding editor of *Nature Canada Magazine*. Membership in the Canadian Nature Federation soared from 1,800 to 24,000 in the five years he served as the magazine's editor and the federation's executive director.

Today his uncompromising reputation as a biological consultant ensures him a steady flow of work. It's a far cry from those early days when he walked away from university with a doctorate in botany to get a job that earned him \$5,000 a year.

His work experiences have honed his senses. As he walks through the forest, it reveals its deepest secrets to him. We look down a sweeping depression in the forest. "A short time ago a logger would bring his horse up through there, he would select some trees and move on, more

or less leaving the forest intact," says Ted. Some old stumps, now barely visible, seemed to verify his suggestion. "Today, they would run a road up the same route, and skid trees down from here, there and all around you."

In fact much of Lanark County has been logged during the last couple of centuries. Unlike most places in Canada, though, it has been carried out by small local operators. Nearly 30 of whom make their living in Lanark County in this way.

Old growth forests, a thing of the past?

Modern, formula-driven forest practices have led to the virtual elimination of old growth forests such as those required by the Red-shouldered Hawk. Yet it was only 300 years ago when the vast majority of North America was made up of virgin forest. Although very little information is available for Canada, by 1938 the U.S. classified only 22 percent of its forests as "old growth." By 1978, old growth forests were virtually eliminated from industry lands



DAVID DODGE

Ted Mosquin fears old growth forests may soon become a thing of the past.

and today old growth forests exist only on public lands, in remote areas and often at high elevations in the U.S.

Modern forest practices have been almost exclusively developed with the idea of maximizing the volume of wood produced from a forest. That means a forest is rarely allowed to grow older than 100 years these days.

The importance of old growth forests is still poorly understood. Even foresters have trouble with the concept, and still today there exists a significant element among foresters who cling to the idea that good timber management is good wildlife management, and there is a need to cut down old forests so they can be replaced with "young, vibrant, productive forests."

"The forest must be re-established to let new growth flourish in order to maintain a healthy habitat for all wildlife," said one hunter's advocate in opposition to the desire of some Lanark folks who want some of the older forests preserved.

The difficulty is: "We have always greatly exaggerated our current state of knowledge," says Mosquin. It is

doubtful that it may have dawned on many early settlers that the vast North American forests could ever be overexploited or that intensive agricultural practices would eliminate the native prairie and result in dozens of endangered species. But it is well established that natural, diverse ecosystems are extremely stable and very productive of life.

Forests can take thousands of years to develop and mature. Cutting them at the age of 100 years might be considered analogous to pulling children out of school at grade three because having learned to read and write they don't need anymore education. "The danger here," says Mosquin, "is that we are grossly violating the future potential of naturally evolving ecosystems, from which all life arose."

Species such as the Bald Eagle, Pine Martin, Pileated Woodpecker, Red-shouldered Hawk and many species of northern wood warblers depend on old forests for survival. A dramatic example of a species dependent on old growth forests is the Woodland Caribou. The caribou require lichens to survive, and

appropriate growing conditions for the lichens do not begin to appear in the forest until it is over 100 years old.

In Alaska it has been found that old growth forests can actually support larger populations of deer than young "flourishing" forests. Deer populations tend to increase for a short time after the trees are harvested, then numbers quickly fall off. Alaska researchers suggest that if the forest is allowed to live beyond 100 years, the deer population once again begins to climb and it can eventually far exceed the populations found in a freshly cut forest.

It does seem clear that some forests must be allowed to grow old if we are to avoid dire ecological consequences and almost certain species extinctions. That is part of what Ted Mosquin is referring to when he says: "Development, whether in forestry or any other sector, must consider and maintain the ecological integrity of the environment."

Members of the Madawaska Committee were vexed: they wanted to find a way to protect the near wilderness quality of small portions

of the county, but it didn't seem like a park could do the job.

Nearby Bon Echo Provincial Park contains beautiful forested land, and Bon Echo Rock, a prominent geologic feature, acts like a magnet to visitors. Park visitors receive a map at the gate, and it shows the locations of 620 campsites, each one sectioned off on the map. It bears a disturbing similarity to a developer's plan for a new neighborhood in Toronto.

"Life cannot survive stranded on an island."

"You draw a line on the map and call it a park, and all around the park the lands are logged, developed or polluted and the park becomes a little island. Life can't survive stranded on an island," warns Mosquin. "The idea of protecting ecological values must extend outside of parks and apply to forestry and communities if we are to make a serious effort at protecting the integrity of the environment," says Mosquin.

What was needed, it was decided, was a creative solution, one which would acknowledge the need for logging, hunting and other land uses, but, equally as important, a solution which recognized ecological integrity, or health of the environment, as a genuine criteria.

Just as the newspapers were beginning to refer to the battle as a "mini Temagami"-style war that would pit loggers against conservationists, a potential solution arose.

At a committee meeting, Sheila Thompson, a local landowner, said: "Why not go for the idea of a trust?"

The Madawaska Highlands Regional Trust Proposal

The Madawaska committee began hinting at the prospect of a trust proposal as early as November, 1987, and in February, 1988, released a comprehensive ecological assessment of the Timber Management Plan and a proposal to create the Madawaska Highlands Regional Trust.

The report proposed: "An ecological concept for environmental protection and land-use planning in Ontario," outlined a land trust that included 4,000 square kilometers of the Madawaska Highlands, the establishment of a governing "Trust Authority," voluntary private trust

agreements, tax breaks for private landowners who participate, and a mandate for protection of regional ecosystems. Surprisingly, the plan also called for hunting, trapping and logging to continue as appropriate land uses in most areas and for regional economic development based on ecological principles.

The plan is based on the community's need to encourage economic development and the societal need to protect the environment.

Flood of public support

The astounding aspect of this kind of common sense proposal has been the outpouring of public support. Media reports were carried in all the regional papers, a full page report appeared in the Ottawa Citizen and even the Globe and Mail covered the story. The Madawaska Committee published its 64-page proposal and made it available to the public. Burgeoning demand for copies forced the volunteers to charge a cost-recovery fee of \$5 for the report, and still, over 200 requests poured in along with over 50 letters of support.

What makes the proposal unique is that it does not approach the issue from the perspective of a special interest. It addresses a universal concern for the environmental integrity of the place we live, which is perhaps why the concept made such a splash in the months following its release.

Prior to the release of the trust proposal, in December of 1987 there were a few tense moments for the committee when Wilfred Ferguson of Flower Station circulated a petition condemning the "proposed wilderness park" and unconditionally supporting the government Timber Management Plan.

Ferguson couldn't have had the Madawaska proposal when he presented the petition, since it hadn't been released. That didn't worry him, however, and he presented the petition, signed by 74 residents, to the Lavant, Dalhousie, North Sherbrooke Council on December 8, 1987.

Mosquin responded with an eloquent full page letter in The New Lanark Era newspaper. Then Jack O'Dette, a resident of Kingston, 100 kilometers away, responded in turn to the Mosquin letter on behalf of the Ontario Federation of Anglers and Hunters. He offered an endorsement of the petition and the Timber Management Plan while referring to

any plans for a wilderness park as a "ploy."

Madawaska Committee members couldn't help wonder why 74 people would sign a petition backing, without qualification, the government logging plan, simply to oppose a "wilderness park" which wasn't even proposed. Then in a remarkable turn of events a letter arrived at the Mosquin home. The letter was from Howard Clifford, former Citizen of the Year in Lavant. He indicated that his family and another area family recently purchased 1,250 acres they planned to preserve in a wild state to "instill appreciation for nature, respect for wildlife, and a deepening understanding and commitment to ecology." Despite the apparent paranoia of a few hunters' advocates, Clifford also clearly indicated that while he doesn't hunt himself, their lands will not be closed to traditional hunting which has gone on in the area for many years.

"We very much like the tone of your proposal and we are willing to assist in any way we can," said Clifford.

"In fact, in the event that your proposal is not accepted by government, we would be prepared to sign an agreement with your association to manage our property according to ecological principles directed by your association."

A few of the local papers persist at presenting the issue as a 4,000 square kilometer wilderness park proposal and an official with the Ontario Ministry of Natural Resources confirmed that this was the central theme of many of the letters of opposition which have only recently begun to arrive from hunters. "We don't see the proposal that way at all," said the official.

Businesses, lawyers, cottage owners, teachers, churches and even the Management Board of Cabinet are among those who have written to Ted Mosquin, either in support or seeking more information.

A representative of St. Paul's United Church wrote to say its environmental group is planning a trip to Madawaska and intend to write letters of support. A cottage owner wrote to say: "We are the last generation with an opportunity to protect old growth forests." When the Rideau Field Naturalists wrote, they included a copy of a letter they sent to the Minister of Natural Resources.

"The fundamental problem, Mr. Kerrio, is that the only plan under



A Flying Squirrel visits a bird feeder near Calabogie.

consideration is the Timber Management Plan," wrote the naturalists. "The plan is established to first and foremost establish a target yield of timber. Nowhere in this large and beautiful area is there provision for even one square kilometer of mature forest to be left in a natural state."

Letters came from members of Parliament, and even the Shabomoka Cottage Owners Association, which suggested in its analysis of the Timber Management Plan: "A more positive proposal has been made by the CPAWS to establish a Madawaska Highlands Regional Trust, to control the sort of threat we are facing from the MNR."

One letter of opposition came from Rick Atkey of Ottawa, who heard about the proposal through the hunters' and anglers' magazine. "As an active conservationist who enjoys many activities in the area in question, I must confess to being somewhat leery of your intentions and real motivation," he said. "I fear an example of poor renewable resource management in the form of elitism and misguided preservation, leading to wasteful non-use and misuse."

And in a telephone interview, Jack O'Dette of the Ontario Federation of Anglers and Hunters (OFAH) made it clear that the hunters are indeed against the proposal. "There is very strong opposition to it in the whole area," he maintained.

He bases this assertion on a public meeting held in July. According to O'Dette, "They called a meeting and asked the OFAH people in particular

to come and explain the proposal to them and give their opinion on the proposal. It went very well," stammered O'Dette, who added, "Of the 700 people there, two people might have been in favor of the proposal, and that's all."

According to Mosquin, the Madawaska Committee wasn't invited or even made aware of the meeting, despite the fact that the response from the meeting is being used by the OFAH as an indication of the level of public opposition.

Mosquin wonders why the OFAH was asked to explain the Madawaska Committee's proposal. By late spring it became clear that the OFAH was determined to undermine the proposal.

O'Dette says hunters have protected the area for 50 years and "Fragile be damned. All the naturalists want is nature trails, which are the most destructive things in the wilderness."

When asked what the OFAH had proposed in the way of improvements to the government logging plan, O'Dette said only that he looked at the plan and after noticing that the plan would permit cutting to within 30 meters of hunting camps, "I said maybe it should be 100 meters, and they listened," said O'Dette. The Madawaska Committee maintains it is one thing to preserve hunting camps and another to preserve Red-shouldered Hawks. While the buffers around the hunting camps are 100 meters, the guidelines for protecting rare Red-shouldered Hawks are less specific, suggesting

only that if discovered, nesting trees will be left alone.

"They have already cut down dozens of nesting trees, and even if they know a nest is present, cutting is permitted right up to the tree thus destroying the canopied habitat," maintains Mosquin. The Ministry of Natural Resources conducted hawk nest surveys last spring, but only after substantial pressure from the Madawaska Committee. Since the Red-shouldered Hawk requires old growth forests to survive, the idea of leaving nest trees intact will do little to save the species, since the habitat will already have been substantially altered. "Once the canopied forests are gone, the common Red-tailed Hawk moves in and drives out the rare Red-shouldered Hawks," explains Mosquin.

"Unless the public forces foresters to change cutting plans, the species will become extinct within the next 30 years," says Mosquin.

In 1974 the OFAH issued a policy statement calling for commercial logging in Ontario parks because they believed cut-over forests tended to support larger populations of game species.

The OFAH's central objection to the Madawaska proposal appears to be an underlying fear that some areas might be closed to their sport of hunting. A local fish and game president has, on occasion, softened his line, suggesting in a letter: "We do have the same basic objectives."

"Hunting is the least of our problem in the Madawaska Highlands," says Mosquin.

"We forget we are part of the environment ... People have to start caring for the environment just like they care for their own children."

Mosquin lives within an ethic; it's not radical, in fact, it's hardly noticeable to those who know him. "People have to start caring for the environment just like they care for their own children, and this includes farmers, rural people, and small towns everywhere," he says.

"People think people are more important than the environment. We forget we are part of the environment, that the environment gives rise to all new life, sustains life and is the norm." A CBC reporter, the week before, appeared on the evening na-

tional news saying: "The so-called greenhouse effect will harm people too, not just the environment." Reporters wouldn't cast aspersions on the federal deficit by referring to it as a "so-called" deficit, though the greenhouse effect is no less real," says Ted. And the statement suggesting environmental problems might affect people too, is hardly a revelation.

Often environmental solutions are so simple, they seem to elude us, he says. "We have to take more action to leave things alone. People have trouble considering non-management as a viable option. Besides, leaving parts of the earth alone is the highest form of management known to man," says Ted.

First of its kind in Canada

If the Ontario government were to agree with the concept and move to create the trust, it would become the first of its kind in Canada, and perhaps a model for future plans.

Mosquin feels voluntary trusts for private landowners could be instrumental to the future of the area. The Prince Edward Island Nature Trust, for example, "is an active, progressive organization with strong connections," says Ron Reed, a writer and consultant who has completed a report on the potential of trusts in Ontario. His report is being prepared for the Federation of Ontario Naturalists and the Heritage Foundation.

"In the U.S., there are already 500 trusts with conservation easements permanently attached to over 1.7 million acres," says Reed. "The Madawaska proposal is unique," he says, "and it could work if it were set up like the Algonquin Forest Authority.

"There is growing disenchantment with government land management. Some of the arguments about the public not understanding forest management are erroneous. This is a fool's paradise; the problem is that the public does understand all too well what is going on," says Reed.

Three or four trusts will be created in Ontario in the next three or four years, he predicts. The major obstacle is agreement from the Minister of Natural Resources.

The government's preference is to settle the matter within existing planning structures. In a recent letter, the minister has asked the Madawaska Committee to suggest whether its



A fall blooming Fringed Gentian displays electric color.

concerns could be accommodated within the Areas of Scientific and Natural Interest (ANSI) program. "The ANSI program is an 'islands of green' approach to environmental protection ... it does not address the key matter of protecting the ecological integrity of entire landscape ecosystems," responds Mosquin.

Vincent Kerrio, Minister of Natural Resources, referred to logging as "the most misunderstood activity that takes place on crown land in southern Ontario." He said his ministry places a high priority on "having good inventories of wildlife habitat and high quality ecosystems."

In March, 1987, the Madawaska Committee made a formal request to the Minister of the Environment for an Individual Environmental Assessment of the Lanark Timber Management Plan.

As of late August, the Environment Department has yet to respond.

In a later interview, the Assistant Deputy Minister, Bob Bugar said, "We intend to continue meeting with

Mr. Mosquin and their committee until we resolve the issue."

In early April, the government announced that the 25 square kilometers in northwest Lanark County would be subjected to an ecological study and that logging would be delayed.

A \$10,000 project to evaluate forest stands in three northern townships and another \$20,000 landforms study to pinpoint areas of natural and scientific interest on the Canadian Shield, including the proposed Madawaska Highlands Trust area were announced.

The media called it a victory, the government called it simply part of the process.

It is an uphill battle, and it is far from over; but back at home on the banks of the Mississippi River in the heart of Lanark County the song of a Veery echoes through the forest and Ted Mosquin smiles like a gardener who has planted the seeds of a new land ethic in the Madawaska Highlands.

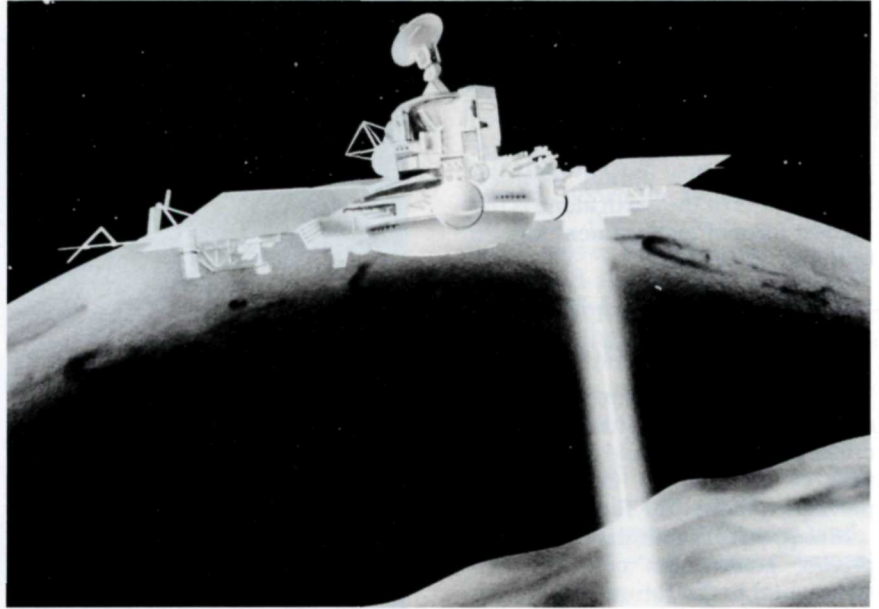
Noah's Ark in Space?

Space Biosphere Ventures, a new American company based in Oracle, Arizona, has begun to assemble the earth's species for the Noah's Ark of space.

Space Biosphere Ventures is assembling what it believes might be appropriate species for the settlement of space by humans. Using an area just over a hectare in size, the company is gathering species from tropical rain forests, desert, ocean, marsh and other habitats inside an area 400,000 cubic meters in size. These assemblages of species are considered as candidates for artificial ecosystems to be created in the far reaches of space sometime in the future.

Environmentalists may have been jesting, but one was rumored to have said the concept represents a new justification for preserving wilderness and we now must preserve genetic diversity for its space colonization potential.

Ted Mosquin



An unmanned Soviet spacecraft will install sensors in the surface of Phobos, a moon of Mars, by using lasers in the spring of 1989. An American-based firm is collecting species of wildlife for potential colonization in space.

EDMONTON SPACE SCIENCES CENTRE

Fire Creates New Life in Grasslands

Accounts of early European travellers and explorers describe spectacular fires sweeping across the prairies of Alberta and Saskatchewan.

Fire, a formidable ecosystem force which kept encroaching forests in check, determined the composition of prairie flora and regulated bird and small mammal populations, was virtually eliminated with the agricultural plow-down of the prairie.

Last Mountain Lake National Wildlife Area, north of Regina, contains remnants of original prairie but even today is threatened by the introduction of non-native species of grass and encroachment of trees and shrubs which were once limited by fire. Today, Last Mountain Lake is the site of some new research into the impact of fire on grassland ecosystems. Researchers hope that new insights gained will be useful in rehabilitation.

Since 1982, Ed Driver of the Canadian Wildlife, Saskatoon, has carried

out experiments on four 45-acre study plots to determine the prefire and postfire fates of eight species of birds and four species of small mammals. They are being monitored along with changes in composition of native and introduced plant species.

Driver says fire is at the outset, destructive, eliminating places for birds and small mammals to live, but as the sites recover from burning, the positive effect to wildlife can be substantial.

Grassland vegetation rebounds through renewed, vigorous growth and results in a more complex habitat for both native and non-native grassland. Birds and presumably small mammal populations increase with diversity.

Even on marginal quality grasslands, viewed by many as wastelands, fire can provide enhancement of habitat which leads to increased bird diversity.

Ted Mosquin

*Source: The Blue Jay
Saskatchewan Natural History Society*

Rare "Forest Ox" Discovered

Unseen for nearly twenty years, the Kouprey, or grey ox, of Indochina has been rediscovered in a densely forested area of Vietnam near the Laotian border.

The Kouprey are believed to roam freely across political borders between Laos, Vietnam, Kampuchea and Thailand.

Nations are co-operating in the animal's conservation through anticipated establishment of trans-frontier reserves and a captive breeding program. National committees to co-ordinate these activities have been formed in each nation, and the World Wildlife Fund and the IUCN (International Union for the Conservation of Nature) are co-operating in the development of a Species Recovery Plan.

Jim Butler

Source: WWF News

Rain Forest Diversities Spawns Tourism

Canadian researchers with an eye to preserving rain forests are now discovering an emerging trend in nature tours as tourists yearn to discover species diversity in the tropics.

It appears tourists are overwhelmed by the intrinsic beauty and incredible diversity of life forms which can be found in almost any single area of natural tropical forest.

One such place, La Selva, a research area of tropical rain forest in Costa Rica, is protected and has become a popular tour destination for Canadians. It boasts some 50 km of hiking trails. According to Laura Tangle of the Organization for Tropical Studies, at La Selva one can find 1,900 species of higher plants, 122 amphibians and reptiles, 400 birds, and 3,000 moths! Other than the overpowering biological diversity, visitors come back from their visits cherishing memories of seeing fresh Jaguar "poo," the occasional giant snake, dazzling butterflies and a com-

plex flora.

Tropical rain forests cover only seven percent of the world's land surface but are home to over 50 percent of species on the planet.

A hectare of Peruvian forest can yield 41,000 species of insects, more than a quarter of them beetles.

The Tambopata Reserve (in Peru) dramatizes both the stunning diversity and vulnerability of many tropical parks. The 26 square-kilometer reserve (but unprotected) encompasses seven distinct forest types, and is home to 528 species of birds, at least 1,122 kinds of butterflies, and rare animals including the Jaguar, Black Caiman, and Harpy Eagle.

Increasingly, it is being recognized that the successful conservation of biological diversity depends less on keeping humans out of fragile ecosystems than on making sure they do the right things when they are there.

Ted Mosquin

The Return of Ontario Bald Eagles

By Ted Mosquin

In the early sixties when I was a research scientist with Agriculture Canada, I nearly lost my job after writing several editorials in the *Canadian Field Naturalist* calling for a ban on DDT. However, public opinion, being led by the publication of Rachel Carson's *Silent Spring* in 1962, soon forced Agriculture Canada to ban this ecologically seditious substance from the Canadian market.

The sad story of what happened to Bald Eagles, pelicans, Peregrine Falcons and numerous other terminal predators as DDT moved up the aquatic food chain is well documented.

Now, 25 years later, it is encouraging to read in a recent issue of *The Blue Bill*, published by the Kingston Field Naturalists, that the Bald Eagle, abundant in eastern Ontario in the fifties, is once again returning to winter around the St. Lawrence River, between Brockville and Ivy League.

Ground surveys last winter regularly recorded two to five eagles per day and aerial surveys carried out by the Ontario Ministry of Natural Resources have recorded eight to 16 per day. Both immature and adult eagles are present. We know this thanks to a volunteer team including Faith Avis, Wayne Burke, Margaret Brown, Bill Cutfield, Betty Gray, Annette Mess, Ken Robinson, Bill Macwell and Pat McManus, all of whom live in the region and participate in the surveys.

One indication of how far the Bald Eagle has to go before it again is a meaningful part of the natural ecosystem of eastern Ontario comes from survey participant, Pat McManus, who noted in 1953 that while lying on his back at his cottage in the Rideau Lakes area, he counted 13 eagles in the sky at one time.

Diversity of Life on Earth

Scientists estimate the rate of species extinction could climb as high as hundreds of species per day within the next 20 to 30 years.

The 'background' or normal rate of extinction is a few species per million years but scientists are now comparing the current rate of extinction with that of prehistoric mass extinctions such as the one that occurred 65 million years ago, when dinosaurs disappeared.

"As species disappear, the intricate links between species — their biological and behavioral associations — are sundered," says Edward C. Wolf of the World Watch Institute. "The extent of our ignorance of biological diversity is imposing," says Wolf, explaining that our ability to predict the consequences of changes in diversity is limited because of our lack of knowledge of the "earth's biological fabric."

"Even ecosystem processes such as the cycling of water and nutrients that link each habitat to global chemical and geological processes can be affected," warns Wolf.

The current known diversity of life on earth is estimated to include 1.39 million species.

Known diversity of life on Earth

Form of Life	Known species
Insects & other arthropods	874,161
Higher plants	248,400
Invertebrates	116,873
Lower plants	73,900
Microorganisms	36,600
Fish	19,056
Birds	9,040
Reptiles & Amphibians	8,962
Mammals	4,000
Total	1,390,992

Source: Worldwatch Paper 78, *On The Brink of Extinction: Conserving the Diversity of Life*, by Edward C. Wolf, June 1987. (The report is available for \$4 (U.S.) from Worldwatch Institute, 1776 Massachusetts Ave., N.W., Washington, D.C. 20036 U.S.A.)

Acid Rain Silencing Loons

The Common Loon, a quintessential wilderness species, is 'most' at risk to the effects of acid rain, says a 1987 Canadian Wildlife Service report.

The 1987 Canadian Wildlife Service study looked at the effects of acid rain on aquatic wildlife in Canada and attracted widespread attention when it concluded considerable segments of waterfowl populations are at risk from acid precipitation.

The study directly contradicted earlier American research that had concluded "relatively few waterfowl in northeastern North America live in the types of aquatic ecosystems that are most vulnerable to the effects of acidification." The Canadian study called the conclusion "invalid" finding on the contrary that significant waterfowl populations do indeed depend on the ecosystems most vulnerable to the effects of acid rain.

In the worst case, the Common Loon and the Common Merganser were found to produce five to eight times fewer offspring in the face of acidification. Both are referred to as piscivorous, or fish-eating species, and the disappearance of fish from many lakes is well documented. The Com-



mon Loon and the Common Merganser were found to be most at risk among waterfowl.

Studies are now looking into the effects of acid rain on invertebrates, which are required as food by many other species of waterfowl.

To many, the Common Loon is one

of the most significant symbols of the Canadian wilderness. Once heard, few ever forget the soulful call of the loon echoing across northern lakes of Canada.

David G. Dodge

Source: CWS Occasional Paper #62

Newborn Hope for Black-footed Ferrets

The successful birth of two ferret litters in captivity has created new hope for re-establishing a complete Black-footed Ferret ecosystem.

The announcement was made by Dr. Ulysses Seal, chairman of Captive Breeding Specialists Group, of the International Union for the Conservation of Nature, working at the University of Minnesota.

"We put ferrets in complete isolation where they are protected from diseases and other hazards. We plan to start releasing them in the wild in 1991," said Seal.

A colony of about 100 ferrets had been discovered in Wyoming, but in 1985, canine distemper struck, wiping out all but 18, which were rescued and saved.

The Black-footed Ferret is included among the rarest and most endangered mammals in the world.

Ted Mosquin

Source: *The Blue Jay*

Saskatchewan Natural History Society

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a designated portion of the estate or residue of the estate for any of the following purposes: eg. to be used as the Board of Trustees of the said Society may decide

or:

to be added to the Society's endowment

or:

to be used for _____

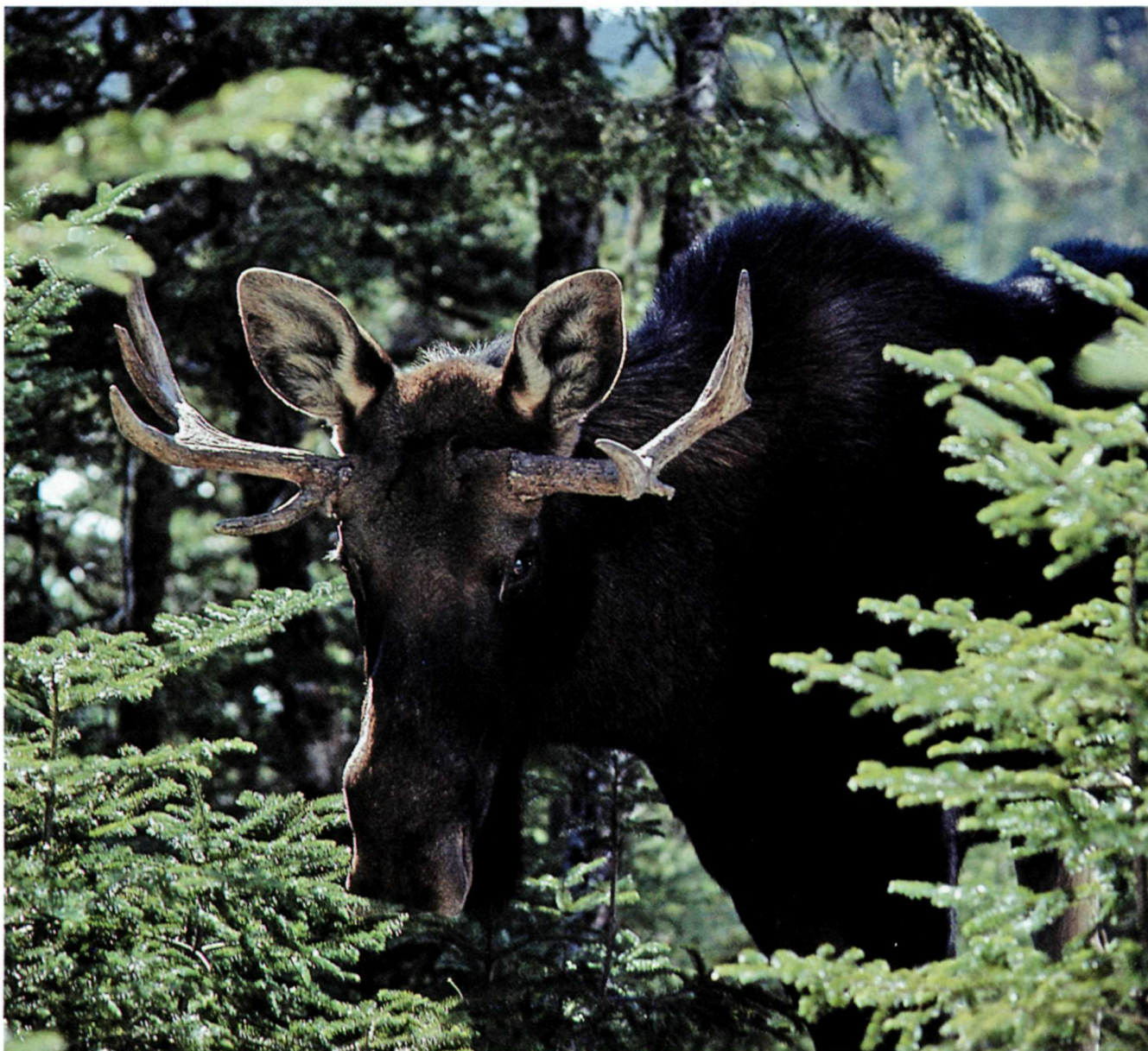
For more information contact:
Canadian Parks and Wilderness Society
Suite 1150, 160 Bloor Street East
Toronto, Ontario, M4W 1B9

Bay du Nord

Wilderness Caught Between Cultures, Time and Technology

Article by Jon Lien and Dave Snow

Photography by Dennis Minty





The moose population in Newfoundland rivals the number of people in the island province's southern capital. Huge caribou herds range across the vast open lands below its rugged Torngat Mountains. And salmon still struggle up crystalline streams in numbers that draw fishermen from around the world.

Little has changed in many parts of Newfoundland since the coming of

the first impoverished European colonist. Here there is yet a chance to see the wild as it has been for tens of thousands of years. But there is a danger that the current generation may be the last to experience it. No other province in Canada protects less of its natural land base. Not even one per cent of Newfoundland's lands have federal or provincial protection, compared to an average of five to eight per cent in most other Canadian provinces.

It's not that Newfoundlanders don't value their wilderness. In fact, there isn't a province or territory in the country in which a higher percentage of people hunt and fish, accounting for the fact that more than 20 per cent of the meat eaten in an average Newfoundland household comes from wildlife. According to a study done by the Memorial University of Newfoundland's faculty of medicine in 1984, many people in Labrador require game and wild plants just to ensure a nutritionally adequate diet.

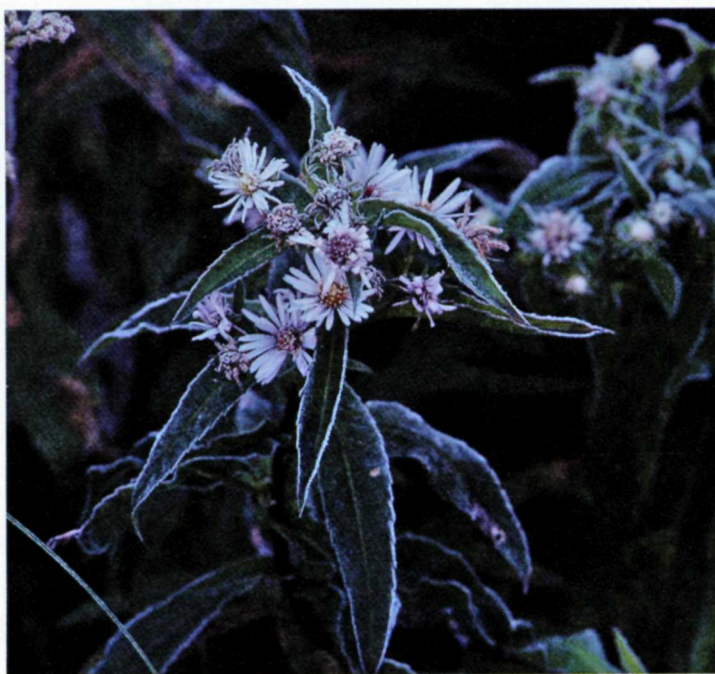
Wild game is especially favored for special occasions and holidays. Even families in urban St. John's, the province's largest city, delight in their annual "feeds" of moose, seal flippers, and rabbit pie.

Basic survival as well as quality of life are intimately tied to the relationship that Newfoundlanders have with the wilderness, which they generally perceive as an abundant source of natural resources waiting to be harvested. And it is this historical relationship with the land that poses the most profound dilemma as the wilderness is increasingly eroded away.

Wilderness preservation has never occurred to most of the province's population. Newfoundlanders simply have a different kinship with the land, one not unlike that of North American natives. While their participation rate in consumptive activities is tremendous, participation in non-consumptive outdoor activities, such as bird watching and photography, is the country's lowest.

American Bittern.





Asters in late fall.

*Diamond Lake as seen from
Mount Sylvester.*





The Bay du Nord River begins as a chain of small ponds.

Newfoundlanders' use of nature extends to other aspects of life and the environment as well. Many homes in Newfoundland are constructed of materials that the owner has gathered from the wild forests. It is this that allows Newfoundlanders, despite their relative poverty by Canadian standards, to have the highest rate of home ownership in North America. Whole families participate in cutting and sawing logs, then using them to build a new house.

In fact, it was discovered over the last six years, through the administration of an assistance program for rural home building, that 90 per cent of new homes in Newfoundland do not have a conventional mortgage. And the personal use of forest products to keep a warm roof overhead accounts also for the approximately 30,000 permits issued annually to cut firewood. For \$10, a Newfoundland is entitled by law to cut 12 cords of firewood a year.

Such activities are often the result of need in a province where unemployment rises above 20 per cent and average income is at the national poverty line. While relatively rich "mainlanders" express concern about man's impact on the environment, Newfoundlanders view such personal harvesting as inherent to

maintaining their way of life.

In other parts of Canada, a growing recognition that the culture and traditions of native Indians is part of the conservation package, is leading to unique problems in protecting and managing wilderness. In Newfoundland, it is the native Newfoundlander, a traditional hunter and fisherman who has lived off the land for almost 500 years, who poses similar concerns for wilderness managers.

The intimate consumptive relationship most Newfoundlanders have with the wilderness means that any steps taken to protect it must be made with the greatest care and public consultation. But while the number of Newfoundlanders who have begun to recognize the need for better protecting their natural resources is small, it is growing.

In the past, the province's scattered population meant that hunting activities had little observable impact on wildlife. That changed throughout the 1960s and 1970s. A growing road system and spreading use of motorized vehicles scarred the face of the traditional Newfoundland wilderness. The work horses and work dogs were replaced by skidoos, all-terrain vehicles and pick-up trucks that provided ready access to what were once remote areas.

And it was in response to a growing perception that the province's true wilderness was all but gone that Newfoundland brought in the Wilderness and Ecological Reserves Act in 1980 to:

"Reinforce the concept that we must be willing to forego some economic development in the interests of the preservation of certain of our wilderness areas which are an essential part of the social and cultural heritage of the residents ... to set aside certain wilderness areas in the province for the benefit and education of our people, thus preserving for all time some of the natural splendors which we have inherited from our forefathers."

Under the Act, once an area is considered worthy of protection, it is examined by a Wilderness and Ecological Reserves Advisory Council primarily interested in preserving representative locations and the province's ecologically special areas.

If an area is judged to be worthy of consideration under those guidelines, the council recommends to Cabinet that it declare a provincial reserve. If Cabinet agrees, a series of well-publicized hearings are held to ensure everyone with an interest in

the area is given a chance to learn about the proposed designation. The provisional reserve may then be considered for permanent status, with or without modifications, or rejected outright.

The concerns of the people living near the reserves are reflected in the fact that hunting and fishing are still allowed in the Avalon Wilderness Area and will continue to be allowed in the proposed Bay du Nord Wilderness Area, although the use of motorized vehicles and the development of recreational facilities is prohibited in Avalon as is woodcutting.

The advisory council's first challenge after its formation was to consolidate previous reserves under the new Act. And it was only after heated public debate that the Avalon Wilderness Area received official designation. In the end, however, its boundaries were, in fact, extended to include more of the range of the Avalon caribou herd.

Prior to the passing of the Act, Avalon was the only designated wilderness area in the province. A second wilderness area, the Central Wilderness Area, a huge expanse of land taking in close to one seventh of the island, was abolished in 1977 to make room for hydro development.



While Cabinet has yet to approve any new reserves, the Wilderness and Ecological Reserves Act provides sufficient clout to ensure the fate of the Central Wilderness Area will not be repeated by the stroke of a Cabinet minister's pen in the areas designated under the Act's jurisdiction. Should Bay du Nord be approved, it would be the province's first wilderness area under the new Act, and as such it would be afforded special status and protection.

Its wilderness has not changed much since the passing of the last ice age. Mighty rivers follow the same thundering pathways down to the sea while Atlantic salmon struggle against the current in search of their natal spawning beds. Caribou herds roam the rugged barrens, while tiny alpine flowers somehow cling to the windswept hilltops.

Natural features such as Mount Sylvester combine with large areas of forest, peatland and barren-ground vegetation to make the area a superb representative of Newfoundland's rapidly diminishing wilderness.

This little-known portion of Newfoundland's interior has survived the 20th century intact, so far. And it is that fact that made it the first candidate for protection under the Ecological and Wilderness Reserves Act.

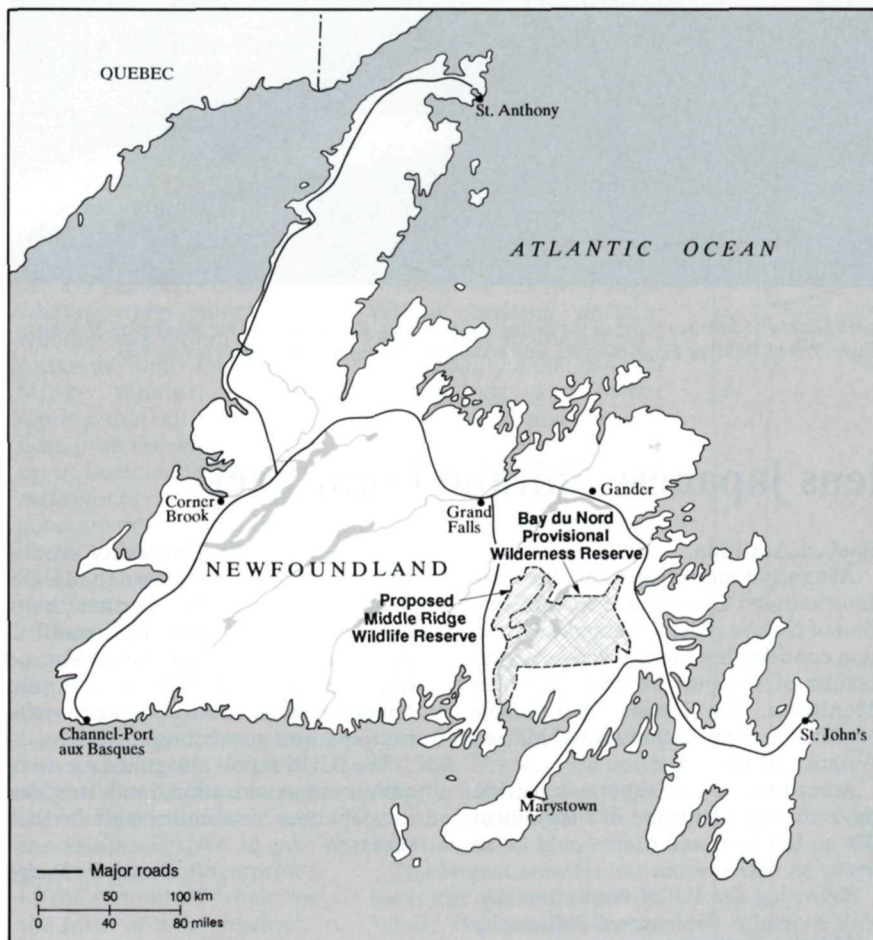
For that purpose, the land in Bay du Nord was subdivided into two portions: the 3000-plus square kilometers of the proposed Bay du Nord Wilderness Reserve, and the 600 square kilometers of the Middle Ridge Wilderness Reserve on its northwest border. The Middle Ridge portion — and the 10,000 caribou that frequent the area — were excluded from proposed wilderness area status because of its potential for mining. It can only be hoped that its designation as a reserve will confer some protection and, if exploration does not identify economically accessible mineral deposits, the Middle Ridge will be given more significant protection.

The final submission of the Wilderness and Ecological Reserves Council, including recommendations for the area's final boundaries, went to Cabinet in mid-April, 1988, after a second series of revisions. The actual borders will not be known, however, until Cabinet makes its ultimate decision on the area. The possibilities range from outright rejection of Bay du Nord area as a protected wilderness designation of a modified reserve, or total acceptance of the council's recommendations.

Bay du Nord is a wilderness waiting for courageous spirits to explore. And it is also a wilderness waiting for a decision on its future.

(Editor's note: In late summer, 1988, the Newfoundland Cabinet deferred a decision on Bay du Nord under pressure from lobby groups demanding that all-terrain vehicles and ski-dos be allowed access, and mining companies that wanted access to carry out mineral exploration and possible mineral extraction operations thereafter. No resolution was reached, no further discussions were scheduled and no date was set for the proposal to come back before Cabinet in the future.)

"They wanted more time to think about it," said Provincial Parks Director Don Hustins. When asked when Cabinet may again consider the issue of designating a Bay du Nord reserve, Hustins replied "Who knows?"



WWF Urges Ban on Giant Panda Loans to Zoos

China's giant panda loans to foreign zoos are coming under increased scrutiny by World Wildlife Fund (WWF) Officials.

Rental of a panda for a three-month display period may cost as high as \$500,000 (U.S.)

The rentals, greatly encouraged by Chinese officials, hamper conservation of this declining species, which now number less than 1,000 in the wild and 100 in captivity and reduces the number of animals available for captive breeding in China. Loaned pandas are also being replaced from the wild to maintain the captive population.

WWF has called for a ban on panda loans into the United States and has appealed to Canada and to all member nations of CITES (The Convention on International Trade in Endangered Species of Wild Fauna and Flora) to halt further imports of pandas for exhibition purposes.

William Reilly, President of WWF (U.S.) stated: "Display animals should be returned to the wild or placed in captive breeding programs as soon as possible. If it is at all feasible for a panda to breed, we must give it a chance to do so."

Jim Butler

Source: WWF News



JIM BUTLER

A child poses with Giant Panda teddy bears at the Beijing Zoo in China. World demand for the display of pandas in zoos is so high, World Wildlife Fund officials fear endangered natural populations are at risk.

Airport Threatens Japanese Shiraho Coral Reef

Planned construction of an airport in Japan could threaten the survival of 317 species of marine life on a coral reef as diverse as the Great Barrier Reef in Australia.

Plans for the airport call for the Shiraho Coral Reef to be covered with earth excavated from the 136-meter-high Karadake Hill to form the base for a two kilometer runway on the Shiraho Lagoon.

At risk are more than 100 species of coral on the four kilometer reef which is 60 percent as genetically diverse as the 2000 kilometer long Great Barrier

Reef of Australia.

At a recent meeting in Costa Rica, the International Union for the Conservation of Nature (IUCN) passed a resolution condemning the plan based on the results of a report authored by Don McAllister, Jon Planck and Angus McAllister of the International Marine Alliance of Canada.

According to the report, scientists have already identified 317 species of life on the reef, and there could be as many as 600 species.

Following the IUCN resolution, Dr. Yuji Yonemori, Professor of Philosophy

and Logic at the University of the Ryukyus sent a letter to IUCN members asking for further help. "Shiraho Coral Reef is beautiful, valuable and alive. With your help, we hope to keep it that way," said Yonemori while asking people to write the Japanese government.

The IUCN report also called for more conservation education, more freedom for Japanese academics and further research.

David G. Dodge

Ozone Holes: More Than Seasonal Antipodes

Upper-atmosphere ozone, which filters out the sun's hazardous ultraviolet radiation, has decreased 1.7 percent to three percent on average over most of North America, Europe and Asia since 1969, according to a new analysis of data from satellites and ground observation stations.

In the southern hemisphere, areas such as Australia and New Zealand have suffered an average ozone depletion of five percent from 1969 levels.

The ozone hole over Antarctica is also no longer limited to the months of July through October as previously thought. It now lasts the entire year, with at least a five percent reduction over the region

at all times. When the ozone-poor air over Antarctica spreads, it appears to reduce ozone levels throughout the southern third of the globe.

A similar, but less deep, ozone hole probably forms over the Arctic Ocean, and scientists say new findings show a recent international agreement — freezing production of man-made, ozone-deteriorating chlorofluorocarbons (CFCs) after 1989 and then cutting it in half by 1990 — will be too little too late.

Because CFCs and halon, a similar chemical used in foam fire extinguishers, last so long in the atmosphere, any additional amounts

released will increasingly damage the ozone layer.

Excessive ultraviolet radiation is known to increase the risk of skin cancer in humans, but perhaps more importantly, scientific experimentation also suggests it poses a serious threat to microscopic phytoplankton at the bottom of the oceans' food chain and hence their biologic productivity.

Under the agreement, a reassessment of the world ozone situation is scheduled for 1990. By then, it is agreed, it should be clear that banning — not limiting — ozone-destroying chemicals is essential.

Ian Hamilton

No Excuse for "Scientific Whale Hunts"

A new technique developed by scientists at Cambridge University, means whales need not be killed for so-called scientific reasons.

In truth, "scientific whale hunts" in which whales are killed allegedly to determine such things as their movements and population sizes, have been used as a way of getting around international whaling bans.

The leading nations in whale killing are: Iceland, Norway, Korea and Japan. Earlier this year, Japan earned international rancor when it first announced it would comply with a moratorium on commercial whaling, then launched a whaling expedition in the Antarctic that killed 300 Minke Whales. Despite reports that all the edible flesh from the whales ended up in fashionable Japanese restaurants, the Japanese government contends that it needs to kill the whales to assess their population numbers.

That information and much more is attainable through a new technique that uses tissue samples obtained through firing a tiny tethered harpoon from an air gun. The harpoon causes the whale minimal pain and the sample is used to produce a "genetic fingerprint" of the individual whale, in the form of a bar readout.

"Furthermore, it permits the genetic relationship between individual whales to be accurately charted, an essential prerequisite for the design of conservation stock management studies," states a recent report in the British publication, *Nature*.

The breakthrough may have little effect on ending illicit whale hunts, however. Although the International Whaling Commission announced a moratorium on commercial whaling in 1982, it lacks the power to impose sanctions on countries that ignore its guidelines.

It is estimated that 100,000 to 300,000 Right Whales, *Balaena glacialis*, once swam in the world's oceans. Only 3,000 to 4,000 are left today and further predictions are that they will be extinct within the next few generations. The number of Humpback Whales, *Megaptera novaeangliae*, has dropped in numbers by more than 95 percent since the advent of commercial whaling. The southern oceans alone were once home to 100,000 Humpbacks, although the current number is estimated at 2,500. The western north Atlantic holds another 2,000 and the north Pacific about 1,000 more.

The largest animals to inhabit the planet, the Blue Whale, *Balaenoptera muscu-*

lus, once numbered 20,000 or more. The current estimate is 6,500. The Bowhead Whale, *Balaena mysticetus*, population is thought to be five percent of what it once was and the number of Sperm Whales, *Physeter catodon*, has been cut in half since the 1940's when two million are estimated to have inhabited the oceans. The worst time for Sperm Whales came in the 1960's, when nearly

30,000 were killed annually.

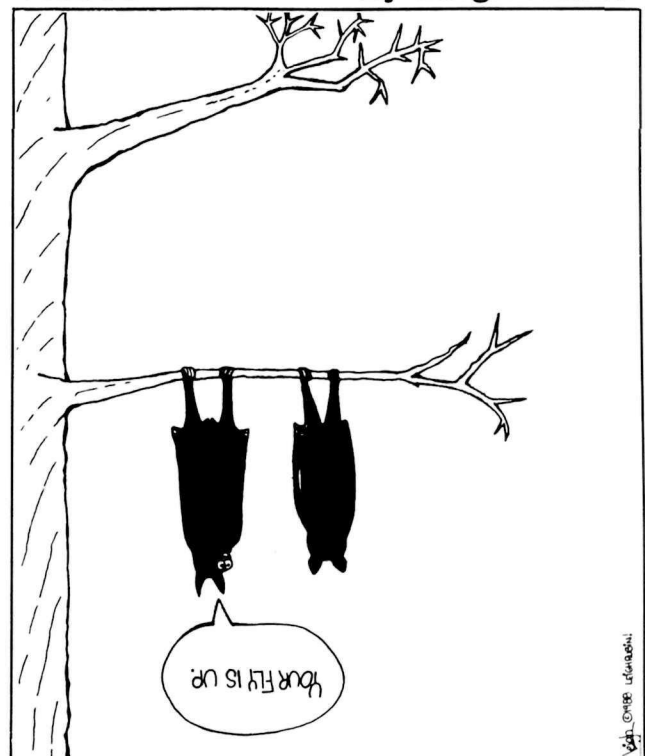
The number of Fin Whales, *Balaenoptera borealis*, is estimated at a third of its highest number, and the Atlantic and Korean populations of Grey Whale, *Eschrichtius robustus*, are extinct.

California greys seemed headed for the same fate, but through extensive efforts of conservationists, their numbers have recovered.

Ian Hamilton

Rubes®

By Leigh Rubin



Acid Rain Ad Blitz Targets U.S. Tourists

A chorus of children sings "la, la, la" to the tune of America the Beautiful. While they sing, it begins to rain, lightly at first, then building into a downpour, all but drowning out the voices. An announcer comes on: "The beauty of North America is for all of us," he says. "Canadians and Americans.

"The splendor of our lakes and rivers, the variety of wildlife, the fertility of the farmlands, the grandeur of our forests, as well as the richness of our heritage buildings.

"But acid rain is threatening it all," he says.

"We must act now ... quickly before ... (the last little voice stops singing) ... it's too late. America, join us against acid rain."

The last line in the radio commercial identifies it as a message from the government of Canada. It was directed at the 10 million American tourists who visited Canada throughout the summer, part of a \$1.5 million advertising campaign designed to influence public opinion in the U.S.

The Canadian government has been seeking a 50 percent reduction in the flow of acid-rain causing emissions

— sulphur dioxide (SO₂) and nitrogen oxides (NO_x) — from the U.S. into Canada to parallel control efforts here. In 1985, Ottawa and the seven provinces east of Saskatchewan agreed to cut sulphur dioxide emissions by half of 1980 levels in 10 years. The federal government also cut allowable motor vehicle nitrogen oxide emissions by 67 percent for cars and light trucks and by 50 percent for heavy duty vehicles.

"We will work heavily on American public opinion and if we don't succeed with this administration, we will put pressure on the next,"

said Environment Minister, Tom McMillan in April, just days prior to the announcement of the campaign.

The campaign included radio, billboard and magazine advertising along with buttons, mailback cards and films distributed through the Canadian National Parks system. This, on top of the efforts of Canadian grassroots environmental organizations, "Whose efforts have so far been resisted by the Reagan Administration," said McMillan.

The U.S. Congress has been deadlocked on legislative proposals to control acid rain, but public

opinion polls in the U.S. suggest Americans are increasingly aware acid rain is a serious problem.

In 1986, 79 percent of Americans surveyed said they felt acid rain was a serious problem. By January of 1988, that number had grown to 89 percent.

McMillan said the advertising campaign, which was concentrated in the east where about 85 percent of U.S. tourists visit, was designed to "pack a punch" while avoiding a tone that might make American tourists feel unwelcome here.

Ian Hamilton



Dial 1-800-USA-MIKE

U.S. Democratic presidential candidate, Michael S. Dukakis is taking aim at the Reagan administration's environmental record.

In releasing his environmental position statement, the Massachusetts Governor condemned the current administration for having "undermined" the environmental commitment of Americans citing as examples: budget slashing at the Environmental Protection Agency (EPA); bargain basement sales of natural resources; weak enforcement of environmental laws; and the appointments of James Watt, Anne Gorsuch and Rita Lavelle.

Dukakis has also pledged to "stop

acid rain." He would not wait for new statutes to reduce sulfur dioxide and nitrogen oxide emissions, the cause of acid rain, he says. Under his presidency, offending states would be compelled to find solutions within three years, says Dukakis, further suggesting that the EPA already has the mandate to reduce emissions by 7.5 million tons per year.

Another environmental promise Dukakis has made is to "designate the Arctic National Wildlife Refuge a Wilderness Area," thereby protecting the porcupine caribou herd now at risk as a result of proposed oil development.

His own environmental record is not

without blemishes, however. Critics in his native state point to the estimated \$5 billion needed to clean up Boston Harbour, one of the most polluted in the entire U.S. The harbour was supposed to be cleaned up by 1977 to meet standards established in the Clean Air Act. Dukakis, who took office as Governor in 1978, now says, reduction of sewage emissions and compliance with the Act won't begin until 1999. "I didn't pollute Boston Harbour, but I'm the guy who is cleaning it up," he rebutted in a television interview earlier this year.

David G. Dodge

Mexico's Rain Forest Stalked by Tree Poachers

The deep green solitude of Mexico's last untouched jungle is ruptured daily by a cavalcade of ancient unmuffled flatbeds groaning under the weight of cedar, illicitly harvested and milled in illegal operations hidden in the heart of the tropical forest.

Logging in the southern Oaxaca's Chimalapas Mountains is a poorly kept secret. Every year 100,000 cubic board feet of cedar and mahogany vanish into some 18 illegal sawmills operated by families that have made fortunes as a result. Pine-covered foothills have been denuded by the tree poachers and about 25,000 acres of once dense forest on the Veracruz border have been cleared to graze cattle.

The 1.8-million-acre Chimalapas Mountains rise from 600 feet above the Pacific 8,000 feet into the sky and range from low-land jungle to cloud forest.

There is a greater variety of trees here than in the combined forests of the U.S. and Canada. You can count 900 different species of flora in just two acres of virgin Chimalapas forest. The hills team with Jaguar, Ocelot, Wild Boar, Tapir, Howler Monkeys, Boa Constrictors, and rare birds.

Recently the Mexican government unveiled plans to drown hundreds of thousands of acres behind a dam that will bring water to a Pemex oil refinery 100 miles away on the Pacific coast at the port of Salina Cruz. The government plans a complex of dams and tunnels that will eventually put 150,000 acres of the Chimalapas under water, despite the pleas of hydrologists who point out that the mountains are the source of 40 percent of southern Mexico's river flow.

The Pemex refineries and petro-

chemical complexes on the Coatzacoalcos have so polluted the once pristine river that it is now forbidden to fish from its oil-laced water. Hydrologists fear the new dam would turn the estuary of the Coatzacoalcos into a swamp of chemical sludge.

Plans to rescue the forest and the low-land jungle have been introduced by world and local organizations. The World Bank, once a prime financier of environmentally disastrous projects such as this one, has offered a \$315 million loan that would allow more selective logging of 600,000 acres by two private companies for export. Local ecologists have called for the creation of an internationally subsidized biosphere reserve in which logging would be restricted to re-forestable areas, leaving virgin forest untouched.

Ian Hamilton

Despite 'CITES,' Roast Jaguar Still on the Menu

A lucrative world trade in endangered and threatened wildlife species remains a dozen years after a treaty to restrict the traffic went into effect.

One hundred nations ratified the Convention on International Trade in Endangered Species (CITES), but that hasn't stopped signatories from importing and exporting a fortune in endangered animals. Though no accurate figures are available, the World Wildlife Fund estimates \$5 billion (U.S.) is spent annually on wild-animal products and about \$1.5 billion of that is on endangered species.

Many countries are signatories to CITES in name only. Leading the violators are Japan, Austria and France, countries which assigned trade agencies rather than conservation agencies to enforce the treaty, and tend to be far less vigilant about violators.

The World Wildlife Fund supplies the menu of the restaurant Le Tatou in Cayenne, French Guiana, South America, as an example. Roast jaguar is the lead

entree, but you can get other "diverse meats" such as fricasseed caiman, tortoise and Macaque monkey. All the animals are either endangered species because of hunting or loss of habitat, or threatened, a classification applied to animals not as close to extinction.

French Guiana, legally a part of France, has become a major supplier of exotic animals from South America to the European Economic Community. The animals are shipped to France and then on to various other destinations.

The treaty, however, has had some successes. The diminished role in endangered-species trafficking played by the fashion industry, is an example. Trade in spotted cats, such as leopards and Ocelots has shrunk dramatically since the treaty went into effect.

But there are still horror stories. Japan imports hundreds of pounds of musk, used in oriental medicine, requiring the butchering of thousands of rare Himalayan Musk deer. Nearly 2,000 raw elephant tusks arrived in Antwerp, Belgium, in

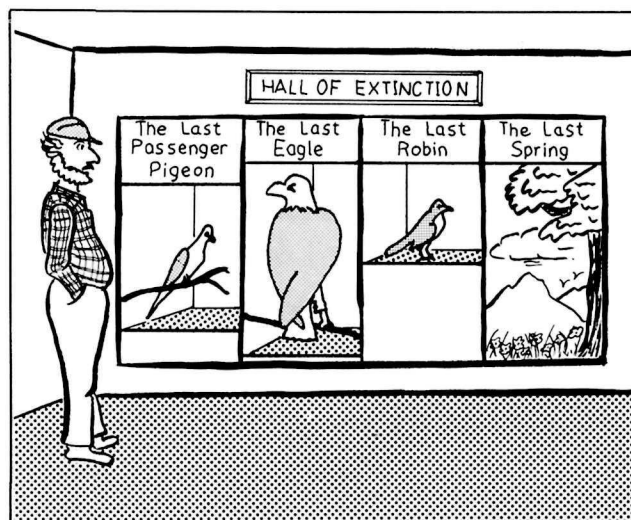
1986 in packages marked "beeswax." And 20 chimpanzees were imported against the treaty into Austria from Sierra Leone in Africa, reportedly for AIDS and hepatitis research.

The black market trade in some endangered animals may end soon, but not because of environmental consciousness. Wild populations of the animals are on the brink of extinction. The Black Rhinoceros population in Africa has plummeted to less than 4,000 animals in the last three

years because of poaching for world markets.

The problem is largely because CITES permits signatories to decide how the treaty will be implemented and what species it will cover. Government officials may look the other way when "protected" wildlife products go through customs. Other countries simply declare some endangered species are not covered under its interpretation of the treaty.

Ian Hamilton



Costa Rica: "\$1 Will Buy an Acre" of Wilderness

The tiny Central American country of Costa Rica stands virtually alone among Third World nations in the success of its environmental efforts.

It is a country bordered on one side by the Pacific Ocean and the Atlantic on the other with a volcanic mountain range cutting diagonally down the middle. Sandwiched between Nicaragua and Panama, within its borders you can count 9,000 species of plants and animals including: Ocelots, monkeys, macaws, and rare and colorful Quetzal birds.

A magnet for overseas money, it possesses the best parks system in Latin America and is one of the biggest centres for tropical research in the world.

Once Costa Rica had one of the highest deforestation rates in Latin America, where people can claim squatter's rights to a parcel of land simply by "improving" it, a designation which includes cutting down trees. Only five percent of land outside nationally protected areas is wooded. And only two percent of the ribbon of dry tropical forest that once stretched along the Pacific coast from Mexico to Panama remains.

Once typical of the environmentally disastrous state of Latin American conservation ethics, Costa Rica is now a model. In the mid-1970s, it established a broad system of national parks and biological reserves. At present, 10 percent of the country's territory encompassing a diverse number of habitats is protected.

Much of the credit belongs to the Fundacion Neotropica, the main Costa Rican conservation organization which buys land through an innovative debt-swapping scheme.

Near the Monteverde Cloud Forest Reserve, a hand-painted sign reads: "\$1 will buy an acre of land." Next to it, a map of the region shows that the size of the reserve has doubled by 10,000 acres in the last year.

The reason for the seemingly impossible is a financial strategy that allows conservation groups and others to buy external debts, currently for 17 cents on the dollar, then donate them to Fundacion Neotropica. The Costa Rican government's Central Bank in turn issues the Fundacion bonds worth 75 cents on the dollar and the conservation group uses the money to buy land and pay staff.

Everyone benefits. The foreign banks get rid of bad debts they had little hope of collecting on, the Costa Rican government internalizes its debt, saving on its dollar reserves, and the environmental protection movement is financed in a way that would be impossible without the debt-swapping scheme.

Costa Rica parlayed foreign contributions into \$5.4 million directed to conservation last year — five times its national park service budget.

Costa Rican leaders are working hard to maintain the debt-swapping momentum. They are steering the park service toward sustainable development — meshing the parks' needs with the livelihoods of nearby residents, tourism, energy production, the lumber industry and agriculture.

Without that sustainable development there will be pressure from a growing population to use park land for farming, timber and other industry which would soon destroy what is being protected. And after that's gone, no amount of ingenuity and good will can bring it back.

Ian Hamilton

Nominations Invited for Heritage Award

Nominations are invited for the Canadian Parks Service Heritage Award. This award was developed to honour achievement by groups or persons, other than federal government employees, in natural and cultural heritage conservation.

To be nominated, a person or group must have made an exceptional and significant contribution to the advancement of the heritage movement. For example:

- contributing to policy development nationally
- serving to implement important national goals

- enhancing the role and methods of management nationally
- discovering, investigating and making known sources of aid to Canadians for the design, creation and maintenance of a significant heritage area system
- creating public awareness, understanding and appreciation of heritage areas
- promoting responsible action among Canadians in stewardship of our natural and cultural heritage
- demonstrating other outstanding achievements with respect to Canadian heritage.

1987 recipients included:

David Baird
René Bureau
The Society for the Restoration of Victoria Hall
Patricia Foran
Steven Offer
Elizabeth Pacey
The Saskatchewan Archaeological Society
City of Saint John

Information packages with details on eligibility and nomination procedures can be obtained from: Inquiry Centre, Heritage Award, Environment Canada, Ottawa, Canada, K1A 0H3. Tel: (819) 997-2800.

Complete information on the nominees must be received before October 31, 1988.

The recipient(s) of the award(s) will be announced on Heritage Day, February 20, 1989.

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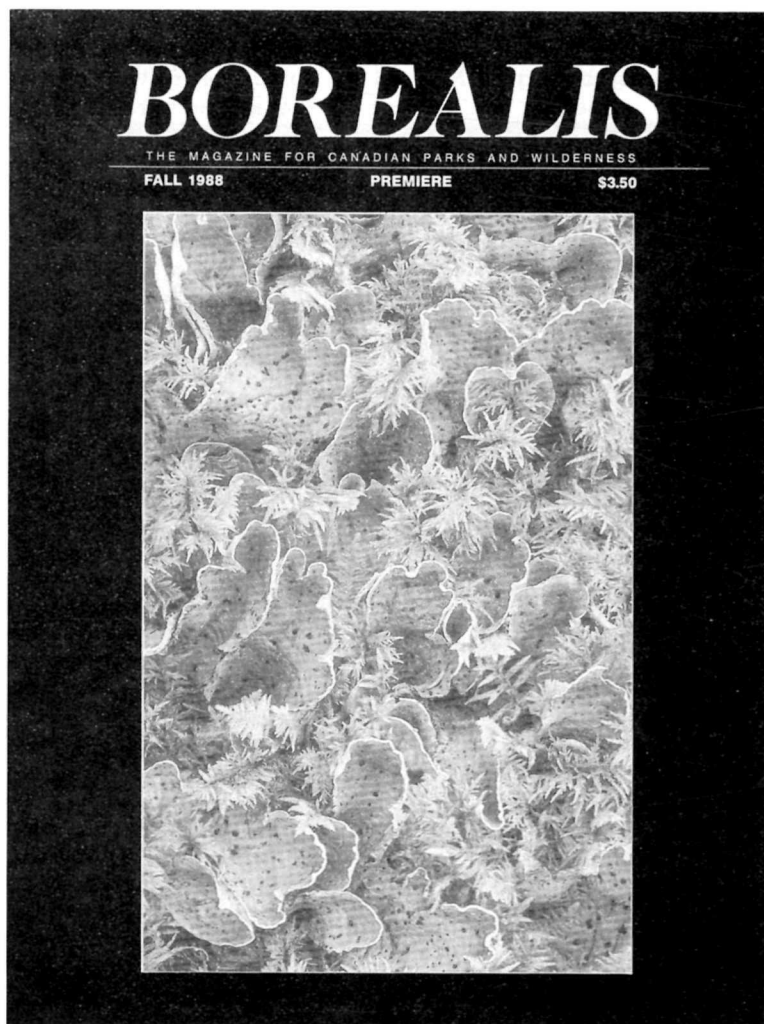
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Alaska 1002

Canadian Porcupine Caribou are Threatened in the Alaska Wildlife Refuge

Article by Ed Struzik



Porcupine Caribou, near Northern Yukon National Park, Canada.

Few places in North America invoke such stark images of wild, lonely landscapes as does the Alaska National Wildlife Refuge. Face southward on one of the 9,000 foot peaks that lie at the heart of this 19 million acres of designated wilderness, and you will see a Boreal Forest filled with spindly evergreens whose growth has been stunted by long winter weeks of -45°C temperatures and longer months of complete darkness. It gets so cold and dry here sometimes that tree trunks split in two and fiercely fighting lake trout freeze almost instantly into a solid mass after being pulled from a hole drilled through four-foot-thick lake ice.

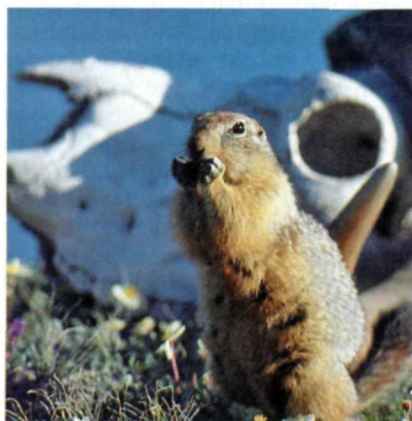


Northwards, the land suddenly drops, then slopes gently into the Beaufort Sea with barely a knee-high bush to block your path or slow the biting, Arctic wind. On a rare, calm summer day, warble flies, botflies and mosquitoes swarm in thick, smokey clouds through which you can carve a path like a swimmer

breaststroking through water. The madness that these insects can inflict is known to have caused caribou to stampede, running themselves to death in a desperate effort to escape.

There are no villages or towns within the interior of the refuge. Not even the Inuit or Indians of Alaska and Canada, who hunt and trap its wildlife resources seasonally, choose to live here year-round. Only Arctic Village and Kaktovik in Alaska and Old Crow in the Yukon lie on the perimeters of the designated wilderness area.

Perhaps that's what caused the former chief of the Atlantic Richfield Company's Alaskan operations to call it a "flat, crummy place."



ED STRUZIK

Arctic Ground Squirrel.

"Only for oil would people want to go there," stated another industry spokesman, explaining at least half of the human enthusiasm for the wilderness area that has gone unmatched since former U.S. Interior Secretary James Watt announced he was tendering the Pacific coast waters and much of the American wilderness to oil exploration.

Beauty, of course, is in the eye of the beholder. And for every oil man, there is at least one Margaret Murie and Olaus Murie to explain the other half of the human interest in the area. Together, the field scientist-husband and naturalist-wife stood near the top of that same 9,000 foot peak more than 30 years ago. What they found was a world of undulating hills filled with luscious sedges, delicate wildflowers, crystal-clear meandering streams and rivers, and wildlife in such varied numbers, it made the heart palpitate with excitement.

"There were no human footprints. It was absolutely untouched as a natural entity," said Margaret Murie, now 84 years old. "The animals seemed fearless; they hadn't seen people before. The attraction is the size, the sheer immensity of the territory. The whole environment has a steady, serene beauty that sings, that will stay forever, that soaks into one's being."

It's been eight years since the U.S. Congress passed the landmark Alaska National Interest Lands Conservation Act (ANILCA) that set aside the 19 million acres of wilderness under section 1002 of the legislation and poured salt, at least temporarily, on the insatiable appetite of the oil industry to drill for energy on the American frontier.

But the oil industry never gave up on Alaska 1002, as it is commonly referred to, even though it got the remainder of the 1,100 mile Alaskan

coastline and most of the State's interior for its own devices. That includes 24 million acres of federal land from the National Petroleum Reserve and a promise of seven million acres more over the next five years.

Today, with Prudhoe Bay's oil riches heading towards depletion, the industry is hungrier than ever. What's whetted its appetite is the long-awaited ANILCA study on the future of the refuge. In it, U.S. Interior Secretary Donald Hodel, with the same voice as the infamous James Watt, recommends that the coastal plain of the national wildlife refuge be opened for oil and gas development in spite of the inevitable "long-term widespread effects" on the area's wildlife and wilderness.

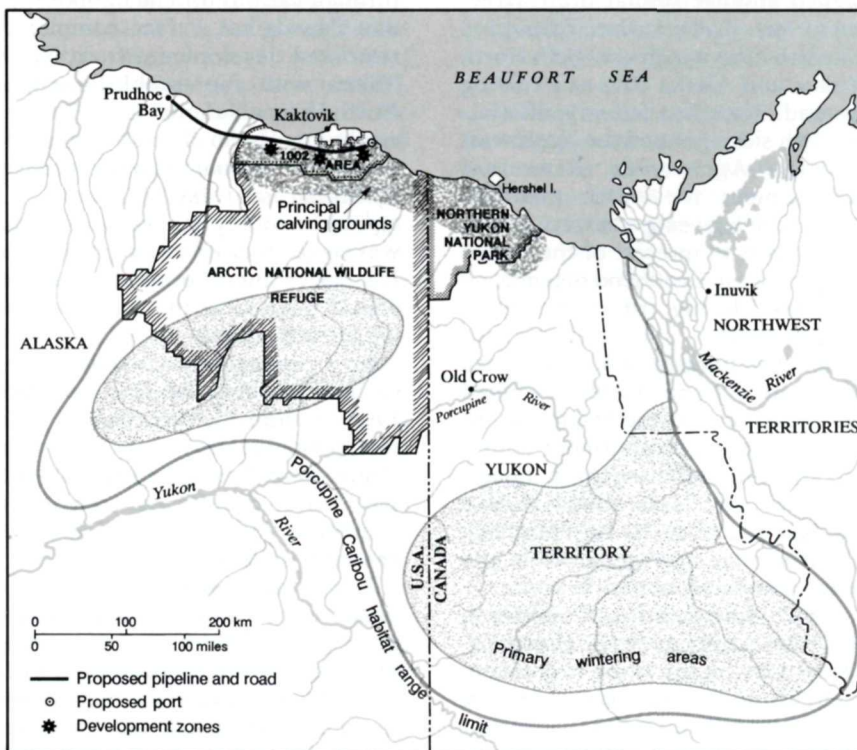
A bigger bombshell could not have fallen on the conservation movement in the United States. With Hodel's recommendation, Alaska 1002 is once again at the centre of a bitter confrontation between America's industrial interests and those of the country's leading conservation groups. At stake is the estimated 200 U.S. days worth of oil that lies beneath the ground of one of the last great wilderness preserves on the continent.

Few Canadians realize it, but the Alaska 1002 study's recommendation, and Hodel's endorsement of it, has profound implications for relations between the United States and Canada on environmental issues as well. For exploration in the refuge

promises to have important, direct environmental and human impacts on the Yukon Territory and indirect, but just as important implications, for most of the border regions that lie between the two countries.

"We're not just talking about the future of one of North America's most important wilderness areas, we're also talking about the ability of Canada and the United States to work together in the interests of environmental protection," said Kevin McNamee, conservation director for the Canadian Parks and Wilderness Society. "If we fail here, there's not much hope of us ever agreeing on ways to solve the problems of acid rain, Great Lakes pollution or the mutual protection of our ocean fisheries."

It's not difficult to understand what McNamee is talking about when you look at a map of the Yukon Territory and Alaska. On one side of the border is the Alaska National Wildlife Refuge, on the other is Canada's Northern Yukon National Park. For the wildlife and the ecosystem in which they thrive, the boundary that separates the two countries and the two protected areas is non-existent. North Yukon and Alaska 1002 are essentially one wilderness range in which the Whistling Swans, Ptarmigan, the Barren Ground Caribou, the wolves, Grizzly Bears, Polar Bears, prehistoric Muskoxen and other Arctic animals move freely from one side to the other.





Stephan Frost of Old Crow in the northern Yukon is one of many Canadians who depend on the Porcupine Caribou Herd.

To both countries' credit, much progress has been made to erase the wilderness border. In 1968, with Denmark, Norway and the Soviet Union, Canada and the United States agreed, under the auspices of the International Union for the Conservation of Nature, to improve research and conserve the polar bear and its habitat along both countries' Arctic borders. In 1986, after protracted negotiations, the U.S. and Canada signed another similar draft agreement to protect the Porcupine Caribou herd which uses both North Yukon and Alaska 1002 as a calving ground. Then last January, officials on both sides penned the Northwest Passage Agreement, a mutual arrangement for Arctic maritime travel which gives special recognition to the unique interest of the native people whose livelihood depends on the well-being of the Arctic environment.

Conservationists like McNamee argue that if Canada and the United States can not pass the first major test of their mutual commitment to protection of border interests in a place as remote as Alaska/Yukon, there's not much reason to be optimistic about similar arrangements in the more populated border areas.

What's transpired so far between the two countries since Hodel expressed his bias in favor of development has added to the skepticism. In March 1987, Hodel belittled Canada's official opposition to

development of 1002, saying Canada has undermined its case by allowing drilling in the Canadian Arctic. He has also suggested that the Canadian government's reason for not wanting 1002 developed is because it wants to sell more oil and gas to the United States.

Environment Minister Tom McMillan, together with External Affairs Minister Joe Clark, have diplomatically reminded Hodel through various official memoranda that Canada has, in fact, completely restricted development from North Yukon with the establishment of North Yukon National Park. Further reminding Hodel of commitments to protect the mutual wilderness range, McMillan said last July that "it would be totally at odds with what was signed today for Congress or the U.S. government to take action that would jeopardize the future of the wilderness area."

At a meeting in Ottawa called earlier this year by the Canadian Environmental Network and representatives from the American Coalition, both sides struggled with the idea of developing a Canadian strategy on Alaska 1002 in light of the apparent stalemate.

It was not an easy chore given the inability of most North Americans to grasp the importance of saving something so far removed from their everyday lives that they might never see or experience it. While there was consensus at the meeting that 1002

potentially impacts on all wildlife within the regions and the Indians and Inuit on both sides of the border who depend on it, the feeling was that it was better to keep lobby efforts simple but compelling in order to attract the interest of the public. And what is singularly simple about Alaska 1002, and entirely compelling, is the Porcupine Caribou — an enormous herd of some 165,000 animals that inhabits both sides of the border.

Like Olaus and Margaret Murie, I got my first glimpse of the Porcupine herd up high in the Brooks Range in 1981, just after Congress passed the landmark 1002 proposal. It was -35°C in mid-March, the kind of day when even a mid-day sun has trouble burning off the icy haze of the night before and everything looks like it's being seen through a polarizing filter.

Heading towards the Brooks range, our pilot took the small Cessna 180 to 10,000 feet and circled sharply above the snow-capped peaks. Moments later, we picked up a radio signal from a collar that had been attached to a caribou the year before. Could the herd have already migrated this far north from its wintering range in the south central interior? We followed the signal. The transmission got stronger. Biologist Don Russell, a Yukon-based Canadian Wildlife Service scientist who has studied the Porcupine Caribou herd for more than a decade, wondered aloud if the animal was alive or a victim of wolves, a Grizzly, or the previous year's arduous migration southward.

Again we circled — this time to get a closer look at three moose pressed together in T-formation within the windless sanctuary of the Malcolm River valley. From 3,000 feet, we could see their steamy breath spiralling upwards from their muscular, motionless frames. Normally a solitary, unsociable creature, moose will sometimes cluster together in the extreme cold to warm themselves with their own body heat.

Minutes later, we tracked down the source of the radio transmission. The caribou was alive and well, but looking rather forlorn with about 50 other animals on the icy ridge of a mountain plateau. Like the moose, the caribou are able to survive the harshness of winter, but why didn't these animals move south with the others where their chances of survival would be much greater? Russell could only shrug his shoulders. "It sometimes happens that a few stay behind," he said. "Why? We can only guess."

YUKON GOVT.

Canadian biologist George Calef once stated that caribou "may be conceived in snow, born in snow and die in snow." So highly adapted are they to the cold, they are called "chionophiles" — snow-loving animals. But biologists also know that the most subtle change in weather patterns can also mean life and death for tens of thousands of the animals. Between 1961 and 1977, for example, slight climatic changes on the western Queen Elizabeth Islands resulted in an extraordinary hardening of the snow pack which made the non-migrating Peary Caribou's foraging for lichens and sedges virtually impossible. The caribou starved to death at such a remarkable rate that 90 percent of the herd was wiped out by 1974.

Barren Ground Caribou have also suffered similar population fluctuations due to weather and other circumstances. A year ago, 800 animals from the Bluenose Caribou herd got stranded on Rideout Island in Bathurst Inlet just after the ice went out. They eventually starved to death after consuming all of the available vegetation. And in 1985 more than 10,000 animals from the George River herd in northern Quebec drowned while trying to swim the swollen waters of the Caniapiscau River.

Every case raises questions about the wisdom of developing an Arctic range as environmentally delicate as Alaska 1002 and adding to the natural hazards that make life and death on the tundra plain so precarious.

Despite assurances from Hodel and the oil industry that the impacts of development can be acceptably minimized, there's little doubt of what is involved when the infrastructure for exploration is set into place.

One exploratory well would require 35,000 cubic yards of gravel dredged from river bottoms and consume another 15 million gallons of fresh water, a scarce commodity in an area classified as a desert. An oil development operation on the Jago river would include a 6,000-foot runway and a central oil-production facility that would occupy 90 acres. Between the Jago and Niguanak rivers, seven 23-acre drill pads and a 40-acre, oil-production complex would be built. A few miles away near the Pokok Lagoon and its beaches, the oil men would build a port facility and a sewage treatment plant. At another nearby site, there would be a second airstrip and another 90-acre production facility with nine other drill pads. All this



Porcupine Caribou, near the Porcupine River.

located within the core area of the Porcupine Caribou herd's calving grounds.

In its favor, the oil industry has some encouraging statistics to back up its contention that all of this activity would not hurt the caribou and other wildlife. The recent decade, for example, has been generally pretty good for the Barren Ground Caribou. Between 1979 and 1985, five of North America's largest herds, including the Porcupine herd, have increased by about one million animals.

One of the smallest herds, the Central Arctic herd of the Alaskan interior, has skyrocketed from 3,000 animals in 1974 to 13,000 in 1986. Reason for hope? Yes. But for development? The industry is convinced that it is, in light of the fact that the resurgence of the Central Arctic herd happens to have paralleled the most intense activity of the Prudhoe Bay oil development and pipeline construction.

If the Central Arctic herd can thrive with oil and gas development, the oil industry argues, there's no reason to believe that the Porcupine herd can't do just as well with development of Alaska 1002.

At least one key political figure believes the industry has a point. "I'd like to see us open up that Alaska refuge," Vice-president George Bush recently stated. "And that's important because it was once said, remember, when they built the pipeline, 'Don't build the pipeline, you get rid of the caribou.' The caribou love it. They rub up against the pipeline and have babies. They have more caribou in Alaska than you can shake a stick at."

Eight years ago, when I was flying with Don Russell over the Brooks

range surveying the Porcupine Caribou herd, neither he nor I foresaw that his research, and the research of other biologists, would be central to Canada's opposition to development of Alaska's wilderness and to a presidential candidate's view of it. Yet that's exactly what has occurred since then.

A mild-mannered, soft-spoken man, Russell has some particularly tough objections to the analogies that the industry and the U.S. administration have been trying to make between the central Arctic and the Porcupine herds.

There's no question that oil and gas development did displace calving animals from the Prudhoe Bay area, says Russell. But this did not seriously affect the Central Arctic herd, primarily because it has never been shown that the herd calved in the area.

Unlike the Porcupine herd, whose calving grounds are concentrated on the coastal plain of Alaska 1002, Russell points out that the Central Arctic herd has alternate habitats of much greater size even though it is 15 times smaller.

"There's little doubt that the negative impacts from development of 1002 and the Porcupine herd's calving habitat would be of far greater magnitude than the impact of Prudhoe Bay on the Central Arctic herd," he says. "Furthermore, the primary reason for the increase in the Central Arctic herd was the hunting restrictions that were imposed at Prudhoe Bay in response to environmentalists' concerns. Caribou hunting was virtually eliminated. At the same time, poachers greatly reduced the number of wolves which preyed on the caribou. Thus, the herd increased."

If anything, the experience of the Central Arctic herd suggests there is much reason to be concerned for the future of the Porcupine herd if development of Alaska 1002 proceeds. Recent research on the Central Arctic herd, for example, suggests that groups of 100 caribou are less successful at crossing pipelines than smaller groups. Since the Porcupine herd forms post-calving aggregations of up to 90,000 animals, there is all the reason to believe they may be reluctant to get to the insect-relief and post-calving grounds on the wind-swept coastal plain.

The controversy over the future of Alaska 1002 has been tainted with a great deal of voo-doo science. In fact, two years before the ANILCA study was handed down, a member of the Interior Department's study team warned Audubon magazine that the debate would develop in that fashion.

Expect "exaggerated estimates of oil potential and dishonest expressions of the long-term impacts on wildlife and wilderness," said engineer G.M. Zemansky. "It was evident from the beginning that the Department of the Interior had a strong precommitment to oil exploration and development, anywhere, at any time, and at any cost to the public."

The latest reports indicate that this is exactly what has happened, particularly with the environmental impacts associated with Prudhoe Bay development. It has only been recently revealed that Alaska Department of Environment Conservation figures show that there were 521 oil spills associated with Prudhoe Bay development on the North Slope in 1985 alone — two of them exceeding 200,000 gallons each. Interior Department figures estimate there were more than 17,000 spills since 1973. On top of that, upwards to 100,000 tons of nitrogen oxide has been emitted into the air by the development — more than the entire state of Maine puts out annually.

Put that together with the fact that each of the 500 wells drilled so far on the North Slope generates approximately 840,000 gallons of toxic waste water a year, and you have the recipe for an environmental catastrophe, conservationists continue to warn.

With the latest revelations, American conservationists feel that there are enough cards showing to convince the public that development of Alaska 1002 should not proceed. What remains to be answered, however, is how the politicians vote on the issue. That probably won't be



Norma Kassi, Yukon MLA for Old Crow.

determined until after the November presidential election when Republican candidate George Bush, who has spoken in favor of development, squares off against Michael Dukakis, the Democratic nominee who has indicated opposition to the proposal.

Meanwhile, it's a wait-and-see position for Canada. "It's really all that we can realistically do," said John Merritt, executive director of the Canadian Arctic Resources Committee in Ottawa. "This is a rare occasion where the Canadian government has done all that it probably can do in pressuring the United States to turn down the development proposals. To his credit, External Affairs Minister Joe Clark took quick diplomatic action to let the Americans know where Canada stands. And Environment Minister Tom McMillan has been getting his licks in at every opportunity."

The Yukon government, while describing Joe Clark's efforts as "first rate," isn't leaving any door unopened to get its point across to the Americans. Central to its concern is the Yukon Indian village of Old Crow, a place connected to the civilized world only by a gravel airstrip adjacent to a hodgepodge of log cabins.

The Old Crow Indian's most important transportation link, however, is the multitude of lakes and rivers that flow towards the Old Crow Flats, one of the few places in Canada that was not overrun by glaciers during the Pleistocene era, and the land that rises into North Yukon, the Alaskan interior and 1002.

On the bleak wintry March day when we landed in the village on our way back from the caribou survey, it was as difficult for me to imagine how the Old Crow people made a liv-

ing as it was to fathom how those caribou survived the winter on the mountain plateau.

Yet by mid-May, even before the ice goes out entirely, the landscape teams with wildlife. From the Old Crow Flats to the Beaufort Sea and eastward to the Mackenzie Delta, tens of thousands of snow geese can be found nesting in the myriad of lakes and pools that dot the tundra landscape. There are enough Whistling Swans to comprise one-fifth of the world's Whistling Swan population. Golden Eagles, Falcons, Canvasbacks, Scoters, Widgeons, Mallards and Old Squaws join them on an annual migration from places as far south as Argentina. Year-round, there are Grizzly Bears, wolves, muskoxen, moose, caribou, and fox.

And there are the people of Old Crow. In the spring camps, they trap muskrat beneath the light of the midnight sun. It is a ritual, annual event of immense cultural and economic importance, providing meat, fish, and fur for food and money.

More than a decade ago, Louise Frost of Old Crow told the Mackenzie Valley pipeline inquiry of the fears the Indians had for development.

"I can see our country being destroyed and my people pushed on reservations, and the white men taking over as they please ... Any major development that has taken place in North America has been of a rapid nature. Their only purpose in coming here is to extract the non-renewable resources, not to the benefit of northerners, but of southern Canadians and Americans."

Today, Norma Kassi, the Yukon MLA for Old Crow, finds herself sending out that same message. "The world is linked together," she says with a little frustration at how weak the Indians' voice is in the current debate. "We need to be responsible for one another's well-being and get away from this myth that we are only having little local effects with projects like those on the Alaskan coastal plain."

Said Yukon government leader Tony Penikett: "This is simply not an environmental issue for us. It is one that is fundamentally important for the future well-being of the people of Old Crow. As the Porcupine caribou herd goes, so goes their ability to live a life connected closely to the land. We're talking about a world class wilderness ecosystem and a unique way of life that has depended on it for tens of thousands of years. We can't afford to toy with it."

Canada's National Parks Act Strengthened

Canada's National Parks are better preserved, thanks to amendments to the 58-year-old National Parks Act passed by Ottawa this summer.

The government and environmentalists have worked to strengthen the Act since 1982. Efforts by the Liberal Government in 1984 were sidetracked with their election loss. In October, 1986, the Conservative Government announced its commitment to amend the act in its Throne Speech and quickly moved to introduce Bill C-30 in the House of Commons in December of 1986. For a year and a half, the Alberta caucus of MPs prevented Parliament from dealing with the bill as they lobbied behind closed doors to weaken the legislation. They were concerned with the conservation thrust of the bill and lobbied on behalf of tourism interests from Alberta.

To finally get the bill into Committee, a compromise was struck. Environment Minister Tom McMillan agreed to defer the setting of legal boundaries around the Sunshine Village ski area in Banff National Park until a public and environmental review of Sunshine's expansion proposal was completed. In the interim, the government's crowded legislative agenda threatened to kill the bill due to a lack of parliamentary time.

The legislation passed by the House includes provisions to establish national marine parks, legislative protection of wilderness areas, mechanisms to establish legal boundaries to limit townsites and ski area expansion, requirements for the Minister to provide for public participation and to table park management plans in the House. As a result of strong and persistent representation from CPAWS, management plans must make maintenance of ecological integrity a first priority, the Minister must table a State of the Parks Report in the House every two years, provisions to allow traditional non-native subsistence activities were severely curtailed, and the ill-conceived Citizens Heritage Fund was deleted.

If Bill C-30 had died on the order paper, Canadians would have had the Alberta caucus of MPs to blame due to the 16-month delay they caused.

—Kevin McNamee, Toronto



DAVID DODGE

The Athabasca River is a Heritage River in Jasper National Park, but at the point where the river leaves the park and enters Alberta, the status is lost.

Alberta Has No Heritage Rivers

Alberta's rivers are threatened by the very agency charged with their management, Calgary Liberal Opposition member Sheldon Chumir charged in the Alberta Legislature earlier this year.

"Alberta Environment is the only department of environment in the whole world responsible for building dams," criticized Chumir prior to entering a motion to adopt a long-term conservation strategy for Alberta rivers.

"Many Albertans love and value their rivers," he said in a speech to the Legislative Assembly, "and they're not happy with how these rivers are being treated."

Chumir's motion would have brought Alberta into the federal Canadian Heritage Rivers program. The motion was quashed, however, when Conservative backbencher, Stockwell Day, moved that debate be adjourned and the overwhelming Tory majority voted Chumir down.

Alberta, British Columbia, and Prince Edward Island are the only provinces in Canada that refuse to participate in the Canadian Heritage Rivers program, set up to protect natural and heritage values of rivers.

Last May, the Outdoor Recreation

Council (ORC) of B.C. once again called for the B.C. government to join the Heritage Rivers program, but the government said no.

"It deeply concerns me that we do not have an adequate mechanism by which a river can be guaranteed protection in its natural state," says Mark Angelo of the ORC's Resource Management Committee.

Twenty-one waterways have been targeted for possible inclusion in the Recreational Corridor program, but as Angelo says, "the planning process has been slow, awkward and without resolution." He says B.C.'s Recreational Corridor designation isn't even as good as the federal Heritage Rivers program, which has significant weaknesses. The federal program leaves management responsibility of designated rivers to the province, and the only recourse for mismanagement is removal of the designation.

Neither are as good as the U.S. Wild and Scenic Rivers Act which provides legislative protection for rivers in that country, says Angelo. The only problem in the U.S. situation is that the legislation may have come too late. Angelo fears Canada will follow suit.

Kevin VanTighem, Jasper

Oldman River: A Question of Ballast

The battle to save three Alberta rivers from the Oldman Dam continues to rage in provincial courtrooms and the media.

To observers of the decade-long debate, it is more than a battle to save the sacred river of the Blackfoot Indian nation, archeological heritage, a world-class trout stream, and some of Canada's finest riparian black cottonwood forests. The Oldman Dam controversy is a clash of values.

"Wild, untamed rivers do not always meet the needs of ... people," says Walter Solodzuk, assistant manager of the dam project. He is calling for "a balance between the preservation of our natural resources as they existed billions of years ago, and meeting the day-to-day needs of earth's population."

On the other side of the argument is Cliff Wallis, Calgary ecological consultant and president of the Friends of the Oldman River, a coalition of environmental organizations. He acknowledges southern Alberta's need for a reliable source of water, but contends, "The government policy of building dams and diversions to increase water supply, rather than

managing demand, is short-sighted, costly, and environmentally destructive."

Pointing to the successful U.S. experience with new water conservation technologies, he argues that "The government's dam policy is a disincentive to look for less destructive alternatives."

Calgary lawyer, Neil Jennings, agrees. He explains that unlike American irrigators, Alberta irrigation farmers do not pay for the water they use, only for its delivery. Jennings says there's no need for the dam and claims its \$350 million price tag will amount to an economic disaster.

Then there are the people caught in the middle of the controversy. Mike Cooper, whose land was expropriated for the dam, is bitter that \$5 million will be spent in attempts to mitigate the loss of one of Canada's finest trout rivers, rather than on human victims of the dam. Ironically, while the dam will provide essentially free water to heavily-subsidized irrigation farmers with whom he and other dry-land farmers must compete, his new farm lacks a reliable water supply.

"The assumption that you can mitigate everything, is a bunch of crap," he says.

Alberta Premier, Don Getty, has staked his political reputation in the area on support for the dam. "The importance of improved 'in stream' flow conditions for downstream fisheries, water quality and recreation, and an assured water supply for municipal, irrigation and industrial uses warrants construction of the dam," he says.

The prestigious Environment Council of Alberta (ECA), commissioned by the government to do the only objective overview of water needs in the Oldman basin, disagreed.

Following 1978 public hearings and studies, in which more than 90 percent of those who commented on the proposed dam opposed it, the ECA determined: "That an 'on stream' dam is not required at this time, nor in the foreseeable future."

The argument will rage long after the dam is either stopped or the valleys vanish beneath the muddy waters of a new irrigation reservoir. At the root of the debate are two fundamental philosophical questions:

1. Is a river only a water resource, to be exploited as efficiently as possible?

2. How much public debt, how many ruined rivers and how much erosion of riparian ecosystems will Albertans accept before irrigation districts — which account for 80 percent of the water consumed in western Canada — are forced to accept limits to the growth of taxpayer-funded water welfare?

Meanwhile, as the debate grinds along, the Crowsnest, Oldman, and Castle Rivers flow quietly through their ancient, wind-blown valleys, and unique cottonwood forests continue to thrive, sustained by the unregulated flows that frustrate Alberta's water management bureaucracy. Burrowing Owls still fly over the grasslands slated for irrigation expansion, and Ferruginous Hawks, Prairie Falcons, and Yellow-bellied Marmots continue to raise their young on the cliffs along the rivers ripe with brown and rainbow trout during the Crowsnest's famed salmonfly hatch.

And a beleaguered Alberta government toughs out the political flack and wonders why Albertans and other Canadians think they know more about rivers than its engineers.

Kevin VanTighem, Jasper



Prepare to abandon ship.



Mystery Conservationist???

In this photograph, leading a group of people on a walk into the mountains, is one of North America's most famous early defenders of national parks and wilderness areas. With the clues provided, try and figure out who he was.

Clues:

- He was born in Scotland 150 years ago.
- He lived in Ontario between 1864-1866 and travelled into Canada many times afterwards.
- He is best remembered for his writings and time spent in the Sierra Nevada Mountains of California.
- He founded the Sierra Club, the very first conservation organization.
- His name is mentioned elsewhere in this magazine as an "influential author."



Special Bonus Challenge for Conservation Detectives:

While exploring the Holland River Swamps in Ontario, our mystery conservationist found a white orchid that had a powerful emotional influence on him. Find this account in a book about him and discover the correct name of this orchid and the name he used to refer to it (four words).

If you are one of the first 20 students

to mail us these names, along with the identity of our mystery conservationist, your name will appear in the next issue of *Borealis*, and you will receive a special conservation poster suitable for hanging in your room. (Send answers along with your name and address to Borealis Detective Search, Box 1359, Edmonton, Alberta, Canada, T5J 2N2.)

How Many Park Symbols Do You Know?

Can you find your way around a park by recognizing the symbols often used on the signs? All of these signs were photographed in parks. Some of these symbols are not widely recognized by park visitors and people are still learning them. A few are pretty tough to figure out. How many can you identify? (The answers are on page 64, but try your best before looking them up.)

1



2



3



4



9



10



5



6



7



8



Parks Search

Elaine Butler and Murray Christman



Inside this word maze are the names of all 34 National Parks and National Park Reserves in Canada. They run forwards, backwards, up and down and some run diagonally, and there are no spaces between words in the puzzle: for example, for Waterton Lakes look for WATERTONLAKES.

The answers are on page 64, but don't peek until you have totally given up! When you have finished, try and locate all of these parks on a map of Canada. Count how many you have visited. Hopefully during your lifetime many new parks will be created. Learning the names of the national parks is only the beginning. The real fun is learning something about them. Ask your librarian about good books on the subject. To get an idea of how special our National Parks are, try reading the article, *South Moresby by Kayak* written by Thom Henley and found elsewhere in this issue.

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A R R P N S M N O O U N C N K P N E T U L N O U L N S L D M
D U O R R E D O E G R E A D S O U T H M O R E S B Y E N I Y
N O E I E G N N S A E H L A T O B P F K D N P T T K A N I D
A I I N A N E A A J O O S I D R A N U G E O H Y O L G H H N
L U T C W A D N U L L U R E V C E Y U N T L A T S A N E K U
S C R E J A S E G L H M F G I K N B A N Y I S I N K I K N F
I U P E A T T I P L K G D F I R K H L A A L K A A N A O R D
E K Y D O B R E A T Y O I G E A A G N A E L R N V K T U P E
R A L W A A G M R O A C A H I N N E C V E C T O O A N C J N
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M N N R R U K O S I O R R I K O G R A I A E N L A J O I A A
S R R D R N G W M E O N D A O I T R P Y A P A I R A M B U F
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L F C S D N A L S S A R G A U A L U R S S S M O E P N U U E
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E E K A W K S A K U P I M E G E S F R M E O T A I R D U T O
P O I N T P E L E E T O A O U H S K F T I P R A N N I A T D
F F B D S T L A W R E N C E I S L A N D S J A N B D R C U U
A L U S N I N E P E C U R B G L A C I E R F E C E P S K Q A
I J B N G C N E U A R U I R Y H A H O D U I D K Y N Y G I A
    
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Canada's 34 National Parks and National Park Reserves

Auyuittuq	Banff	Bruce Peninsula	Fundy
Elk Island	Ellesmere Island	Forillon	Grosmorne
Georgian Bay Islands	Glacier	Grasslands	Kootenay
Jasper	Kejimikujik	Kluane	Mount Revelstoke
Kouchibouguac	La Mauricie	Mingan Archipelago	Point Pelee
Nahanni	Northern Yukon	Pacific Rim	Riding Mountain
Prince Albert	Prince Edward Island	Pukaskwa	Waterton Lakes
South Moresby	St. Lawrence Islands	Terra Nova	
Wood Buffalo	Yoho	Cape Breton Highlands	

Sharing What You Know:

A good environmentalist (someone who cares for and acts on behalf of the environment) tries to share wherever possible their knowledge of nature with others. This is similar to what our "mystery conservationist" is doing in the photograph.

You, too, should share the things you know with others, especially those younger than yourself. The following activities work well with your younger brothers and sisters, or other groups of young children. Do something good for the environment by using these activities with others to help them learn more about nature and conservation.

1. Have everyone in your group find a stick that looks like an animal. Sit in a circle and have everyone try to guess what the animal is. Once you have gone around using everyone's "animal" stick, go around again and give

everyone a chance to say what problems are currently affecting each of these animals and what might be done about it.

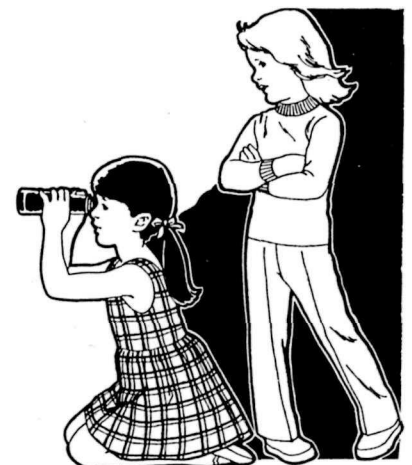
2. Ask everyone to go and do something nice for a plant. When they return sit in a circle again and let each person share what they did.

3. Find something in nature that is dependent upon something else. Then discuss how all things are dependent on something else.

4. Find something in nature that is changing. Discuss how all things are really changing, and that there is nothing that is not changing. How does this affect national parks or the wildlife that lives there? Discuss whether some changes are good and others are bad. Can you see examples of good and bad changes right where you are?

5. Make some tiny place a little more

beautiful. Let everyone discuss what they chose to do. Ask everyone what makes something beautiful.



Point Pelee Birders are Big Business

Communities adjacent to parks and nature reserves receive tangible cash rewards from visiting nature lovers.

According to the findings of a University of Alberta research team, led by Dr. Jim Butler, the May bird migration at Point Pelee National Park in southern Ontario alone generates \$3.8 million from birdwatchers and of that, \$2.1 million is spent in local communities adjacent to the park, mostly for food and accommodation.

Annually, Point Pelee generates \$6 million from birdwatchers. The University researchers have found the average May birder travels 689 kilometers to Point Pelee, stays 3.4 days and spends \$224 per trip. Astonishingly Butler's team has found the average household income for the birdwatchers is \$57,000, one of the highest ever recorded for a recreational user group, and he says, with improved availability of products and services for birdwatchers, local communities could easily triple their current revenues.

David G. Dodge, Edmonton



Birds are big business for communities such as Leamington, Ontario.

Sixty-four Arrests in Strathcona Park, B.C.

After the arrest of 64 protesting British Columbians, the B.C. provincial government reacted by setting up yet another advisory committee to look at the future of Strathcona Provincial Park on Vancouver Island.

In 1985, the B.C. government, frustrated by the heated controversy generated by a host of intense wilderness issues and in the face of declining public support, announced the creation of the Wilderness Advisory Committee, which was mandated to study and make recommendations on 26 of the most urgent issues in B.C.

The controversial committee's recommendations were straightforward enough: outline options for additions and deletions of lands to rationalize boundaries, seek public review and then make whatever changes thought to be desirable or necessary.

In the case of Strathcona Provincial Park, the committee suggested the mineral belt, including claims by Westmin Mines and Cream Silver be designated as recreation areas. The designation would allow for mining exploration and later, possible

reconversion back to park status. It may have sounded like a less-than-ideal solution to conservationists but the concept emerged because of the Tuner Ruling in Wells Gray Provincial Park. In this case, the court ruled that the provincial government must either allow mining exploration and development or buy out the claims.

As if the B.C. government didn't have enough political problems on their hands, they then opted to supersede the whole public input process and take things into their own hands. In January of 1988 an order-in-council enforced several extremely controversial deletions and additions to Strathcona Park.

Then in March, another order-in-council established the recreation area in the mineral belt of Strathcona, which then allowed mineral exploration to begin in the park. Then, B.C. Parks released a park master plan for public review despite the fact that the range of options had virtually been decided by previous actions. With the way cleared by the order-in-council, the rigs advanced into the alpine wilderness of Strathcona and frustrated environmentalists felt they had no choice but to

block the roads, which prompted the 64 arrests.

Then to add bureaucracy to insult, another advisory committee was struck, in response to the public resistance.

It seems like a strange twist of events, but had the B.C. government followed the original recommendations of the Wilderness Advisory Committee and started with public review and ended with enforcing changes, the whole dilemma might have been avoided.

The newly created Strathcona Advisory Committee held public hearings on the matter and new evidence brought forward, showed that not all mineral claims within B.C.'s provincial parks needed to be compensated. Evidence at the hearings appeared to indicate the need for a re-evaluation of the government's approach to the mineral claims in parks. Although the future of Strathcona is still in limbo, the B.C. government now has a much clearer picture of where public opinion stands.

—Rick Searle, Victoria

South Moresby: "The Spectre of Mining"

Canada's newest national park may be closed before it's open if Ottawa can't negotiate a formal agreement with native Indians.

British Columbia and federal officials signed the formal agreement in mid-July which ensures that the lush, primal rain forests of South Moresby in the Queen Charlotte Islands anchored 64 km off the B.C. coast will be preserved.

Miles Richardson, president of the Council of the Haida Nation, wants an agreement on the future of the archipelago. He made the statement after the signing of the federal-provincial agreement that formally declared the pristine region a national park reserve.

"Gwaii Hanas (the Haida name for the region) will be closed in 1989 until we've come to an agreement with the Government of Canada," Richardson said.

Richardson said the deal provides Canada with a historic opportunity to address the question of unresolved aboriginal title because it removes the B.C. government's jurisdiction in the area.

The Haida have refused to relinquish their aboriginal title to the islands, and said they would not honor the agreement because they were not consulted.

Environmentalists are worried about the agreement too — because they say it sets a dangerous precedent by allowing mining within the park's boundary.

Dozens of old claims are still valid, and Environment Canada has said it does not have the money to buy them out. The government expects most will lapse without development — but the spectre of one or more mines operating in the park is on the minds of environmentalists and many federal officials.

A side effect of the memorandum signed last summer by Prime Minister Brian Mulroney and B.C. Premier Bill Vander Zalm which preceded July's formal agreement has been more industrial activity throughout the Queen Charlottes, says Thom Henley, one of the leaders in the long campaign to create the national park.

"The logging situation on the islands has never been worse," he said. A combination of overcutting, wood waste and the recently activated mining claims shows that "the destruction is continuing."

To get around the huge roadblock of aboriginal rights, National Park planning in northern Canada has been moving towards a model of "joint



South Moresby.

management" between government and native people.

Under terms usually spelled out in land claims agreements, native people are given the right to continue to hunt, trap and fish within parks.

They also have a say in the management of renewable resources through guaranteed seats on advisory boards.

But Henley said the current model of "joint management" was, in fact, one of the stumbling blocks to establishing a national park on traditional Haida land in South Moresby.

Henley noted the federal minister of the environment would still have the final say on what went on in the park.

The Haida fear this would affect their sovereignty over the area and prejudice their outstanding land claims outside the park.

B.C. Parks Minister Terry Huberts

and federal Fisheries Minister Tom Siddon (Environment Minister Tom McMillan was unavailable) signed the agreement but admitted there are still unresolved issues regarding the park's future.

They say the three key ones are the amount of compensation to be awarded to forestry products companies with timber rights in the area, the estimated 130 valid mineral rights claims in 11,000 hectares of the 147,000 hectare park, and the aboriginal claims.

The federal government is paying most of the \$113 million cost of the park, which includes \$50 million for economic development in the region to help make up for the loss of forestry jobs.

That makes South Moresby by far the most expensive national park in Canadian history.

Ontario Parks: A Rediscovery

Ontario's Minister of Natural Resources, Vincent Kerrio, last May announced the reversal of a 1983 policy decision permitting sport hunting, trapping and mining in provincial parks.

He also pledged to fulfil a 1983 promise to create 53 new provincial parks which would bring the total to 270. Currently, Ontario has 217 parks containing 5.5 million hectares including the 2.5 million hectare Polar Bear Park.

Kerrio's decision came after a five-year public battle between naturalists and hunters.

In 1983 the government promised 153 new provincial parks, but, in the same breath opened them up to hunt-

ing, trapping and mining. Infuriated members of the Federation of Ontario Naturalists (FON) and the Wildlands League of Ontario, mounted an aggressive lobbying campaign, armed with statistics from a 1980 Gallop Poll which stated 86 percent of Ontario residents were against sport hunting in parks.

After five years of public furor, Kerrio reversed the 1983 decision and said, "The government believes that the need to preserve a certain amount of 'pure' wilderness is too important to compromise."

David G. Dodge, Edmonton

Temagami: The Ambivalence Waltz

Ontario natural resource and environment ministers danced the ambivalence waltz last May when on the same day they announced the re-establishment of the wilderness status of Lady Evelyn-Smoothwater Provincial Park and issued permits for the Red Squirrel logging road which will dissect the park.

In conjunction with the announcement, Ontario Minister of Natural Resources, Vincent Kerrio, also announced the creation of three new provincial parks in the Temagami area.

"It could have been a red-letter day for the environment," said a disappointed Heather Cook, of the Wildlands League of Ontario, in reacting to the compromise announcement. "The 'either ... or' attitude applied in this case represents a perpetuation of the status quo with respect to environment and economy. The Liberal government had a golden opportunity to move beyond the economy-versus-the-environment attitude which, particularly since the Brundtland Report, is increasingly viewed as archaic," she said in an article published in *Ontario Network News*.

Conservation groups in Ontario had called for public hearings to accompany the Environmental Assessment of the Red Squirrel Road Extension but Environment Minister Jim Bradley rejected this notion claiming a hearing would take more than a year and would have caused undue delay in accessing timber stands.

The Temagami Wilderness Society received widespread support from a variety of organizations and high profile Canadians such as Margaret Atwood, Pierre Berton and Robert Bateman in their bid to stop the road, and ban logging from a 3,500 square kilometer buffer zone around the park.

A report released by the Canadian Parks and Wilderness Society in May, called for the government to deal with the Temagami issue as a conflict resulting from "poor forestry practices, a lack of accurate information of timber supplies and wilderness areas, a lack of government accountability and inadequate attempts to diversify the local economy," not simply a fight between wilderness advocates and loggers.

In 1983 the Ontario government opened the park to hunting, trapping and mineral exploration. Kerrio's announcement reverses this and creates Obabika River Waterway Park (17,900 hectares), Sturgeon River Waterway Park (3,350 hectares) and Solace Lakes Waterway Park (5,420 hectares) in the Temagami region.

Kerrio has also promised to close the Liskeard Lumber Road in 1994, two years ahead of schedule, and to form a public advisory group.

The issue has deeply polarized local residents, and Chief Gary Potts of the Teme-Augama Anishnabai (The Deep Water People) has claimed the Red Squirrel Road will "kill the area."

David G. Dodge, Edmonton

Nova Scotia Parks Policy Announced

In April of 1988, the Minister of Lands and Forests, Jack MacIssac, unveiled what he termed "a comprehensive new parks policy for Nova Scotia." The policy calls for the improved identification, acquisition and development of provincial parklands, beaches, heritage trails and sites, and waterways for recreational use. The policy also recognizes the need for the province to acquire and protect unique or special lands for environmental purposes.

To assist Nova Scotians in maintaining an active role in the planning and management of the provincial parks, a Parks and Trails Advisory Council has been established. In addition, local

park councils are to be appointed to provide advice on local parks.

The policy introduces a park classification system that recognizes a range of recreational opportunities that can be provided. The system will include the following categories: wildland parks, natural heritage reserves, historic parks, natural environment parks, outdoor recreation parks, and wildlife parks.

The Canadian Parks and Wilderness Society reacted positively to the policy, suggesting a renewed commitment to the protection of unique landscapes and ecosystems is welcome news.

Kevin McNamee, Toronto

Forestry in Ontario:

An E.A.

Fear is mounting, that after more than a decade of work, an environmental assessment on the impact of forest management in Ontario will do little more than maintain current logging standards.

Early in 1988, the Ontario Ministry of Natural Resources released the fifth draft of a Class Environmental Assessment (Class EA). Started 11 years earlier, it was to be a definitive study encompassing the entire spectrum of forest management in Ontario, of which, nearly 50 percent is forest land.

"Even the title of the Class EA has changed," says Donald Huff, chairman of the Forests for Tomorrow (FFT), a coalition of five environmental organizations that are working to raise the government's myopic focus on timber as the only value of Ontario forests. The Class EA has gone from a study of forest management to timber management, says Huff.

As it stands, the class assessment may not even live up to the province's Environmental Assessment Act which seeks, "the protection, conservation and wise management in Ontario of the environment," says FFT lawyer Michelle Swenarchuk. The FFT maintains the "protection, conservation and wise management" can not be assured because of the virtual non-existence of inventories of other botanical and wildlife species in the forest environment other than timber.

In fact, the ecological description of all forest lands in Ontario comprises only two and one half pages in the fifth draft of the Class EA. The words *forest ecology* are not even mentioned in the document.

Swenarchuk maintains that the Class EA lacks the basics of credible scientific or technical work normally accepted as fundamental to an environmental assessment process.

There is some optimism among environmentalists, however. Heather Cook, forestry critic for the Wildlands League notes: "It (EA Act) used to be called the 'environmental exemption act.'"

"Change comes slowly, and there will be no clear winner or loser when it is all over, but to even get this far is something of an accomplishment," she concedes.

David G. Dodge, Edmonton

Grasslands National Park Still Isn't

Although clearly marked on numerous maps, Grasslands National Park has yet to become a national park despite 30 years of public pressure.

The proposed park would protect 350 square kilometers of remnant prairie grassland in southeastern Saskatchewan. While federal and provincial authorities continue to say negotiations are progressing, no tangible progress is evident in the form of on-the-ground protection.

Where exactly a final agreement sits is not clear. It appears that the Saskatchewan cabinet has approved-in-principle a final agreement subject to the clearing up of some technical points. On the federal side, Environment Minister Tom McMillan confirms that senior government officials (possibly in the Prime Minister's office) are concluding the negotiations on Grasslands. Thus, it appears the onus rests with the federal government to conclude the agreement. It is apparent a final agreement is not a priority among federal officials who are dealing with higher priorities such as free trade and a potential election.

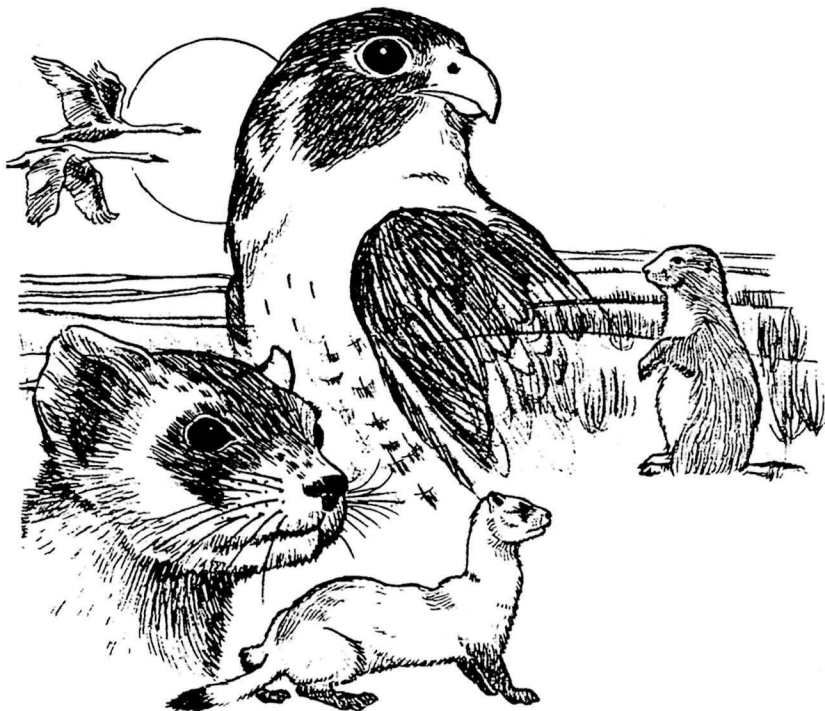
There is also a strong indication that at least a core area of approximately 150 square kilometers of the Grasslands National Park and a final agreement will be a reality by September, 1988.

Canadians thought a park had been established early in 1981 when the two governments signed a "final" agreement. However, the agreement turned out to be little more than an oil and gas exploration agreement, and it failed to commit either side to specific actions and dates that would produce a park.

The real victims of this extended period of inaction are the local landowners. A national park with a definitive land acquisition program and conservation and visitor-use programs, along with promised economic benefits, has been promised to the local communities for several decades.

Kevin McNamee, Toronto

Editor's Note: Late in September, Environment Minister Tom McMillan announced the establishment of Grasslands National Park amidst a flurry of controversy over alleged tradeoffs between approval of the Rafferty Dam and establishment of the park.



WORLD WILDLIFE FUND

Leave Some Wild in the West

If the World Wildlife Fund (WWF) and its sponsors are successful, the Wild West Program may bring back Burrowing Owls to the Canadian Prairies.

The owls are the target of one of 80 projects underway to save rare, threatened or endangered species in an effort to maintain ecological diversity on the prairies. The program also seeks to maintain life support for these species and to encourage balanced land use by landowners.

Agricultural and modern development of the prairies has led to incredible habitat losses. Almost one half the rare, threatened or endangered species

in Canada are from the prairies. Only 10 to 25 percent of the five prairie ecoregions remain, within which the WWF is proposing a system of protected areas to be outlined in a Prairie Action Plan scheduled for release this fall. The plan will also describe methods for encouraging a more balanced approach to land use.

"Not only the mountains need to be protected," says Miles Scott-Brown, Executive Director of the Wild West Program. "We tend to overlook the beauty and the diversity of the prairies."

Michele Deakin, Calgary

Fire in Jasper National Park

Torching national park forests used to be the work of vandals and careless campers.

Smokey the Bear may have trouble with this but today a third group is striking the matches: the national parks' Warden Service.

For 80 years the Canadian Parks Service has been extinguishing natural and human-caused fires, and the result has been the unnatural evolution of the national park ecosystem and an unnatural buildup of deadfall.

"Fire is a natural element in the ecosystem," says Jasper senior fire management officer Brian Wallace, who once, charged only with putting fires out, now is also in charge of lighting them.

Historically fire has been viewed as a villain of the forest, but in recent years the realization that fire is an essential component of a naturally evolving ecosystem has changed the way we look at fire.

continued next page

... continued

Fire

"We can not turn the clock back, and it's hard to say what the natural frequency of fire was before the presence of Europeans," says Kevin VanTighem, Chief Park Interpreter of Jasper National Park.

"It is not a question of how much fire, but the mere presence of fire that is important in maintaining vegetative diversity and a healthy ecosystem, says VanTighem.

The problem now is that after so many years of fire suppression, there are substantial buildups of deadfall, which might have been removed by natural fire, but now pose a significant fire threat.

"If we don't want to have an inferno that will wipe out huge stretches of the parks, destroy wildlife, park facilities and even people, we have to get going on prescribed burns," warns Wallace.

Standing in the way is the imposing requirement of justifying and organizing each planned burn. Ironically, while the main reason to burn is for the future safety of the public, public protection is also the barrier which keeps wardens from striking more matches and burning more hectares.

"If we are going to do it at all, it's got to be done right," says Wallace. "We don't want to start the inferno ourselves."

This year in the four mountain parks of Alberta, just over 1,100 hectares were burned in an area of more than 20,000 square kilometers. It's a tiny drop in the bucket but a step in the right direction. Whether the prescribed burning program can restore fire to its natural role in national parks is a question which remains to be answered.

Bill Overend, Jasper

Moving?

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Don't leave Borealis behind!

Logging, a Threat to Orca Whales

Logging of the lower Tsitika watershed on Vancouver Island's east coast threatens 140 to 150 Orca Whales who regularly congregate in Robson Bight.

The Tsitika watershed empties into Robson Bight and environmentalists fear logging will harm beaches and waters of the bight with siltation and debris carried down the Tsitika. The bight has become known internationally for extraordinary concentrations of Orca Whales.

The upper Tsitika watershed has already been logged by MacMillan Bloedel, who is now set to move into the forests of the lower watershed. George Wood of the Sierra Club of Western Canada has fought for the protection of the area for eight years and he says, "It's an absolute mess up

there," referring to the logged portions of the upper watershed. Wood is convinced further logging will threaten the whales. "The lower Tsitika must be protected," says Wood.

Wood helped to draft a park proposal back in 1981 that would see approximately 4,460 hectares of the lower watershed protected. The proposal has not been accepted by the provincial government. Even the Minister of Environment and Parks, Bruce Strachan, remains somewhat cool to the proposal. "I've been assured that logging can be done without disturbing the watershed," he said.

What can be done and what will be done are two completely different issues, fear environmentalists.

Rick Searle, Victoria

First Ministers Endorse Environment Economy Report

In November of 1987, Canada's first ministers endorsed the report of the National Task Force on Environment and Economy.

Released in late September, the report makes 40 recommendations to integrate environmental and economic planning and decision-making in Canada. Key among these recommendations is a call for consideration at the most senior level, of environmental issues, in concert with economic development issues.

The Task Force was created in October, 1986, by the Canadian Council of Resource and Environment Ministers as a direct follow-up to the May, 1986, Canadian visit of the World Commission on Environment and Development. Its membership is comprised of seven of Canada's environment ministers, seven senior representatives of major Canadian corporations and three representatives of environmental and academic groups.

Task Force Chairperson, Manitoba Environment and Workplace Safety and Health Minister Gerard Lecuyer, said: "by endorsing the report, the first ministers have indicated their support for sustainable development, promoted by both the World Commission and the Task Force. The endorsement brings Canada closer toward integration of environmental and economic planning," he added.

Task Force Vice-chairperson Roy

Aitken, who is Executive Vice-President of Inco Limited, said he is very encouraged by the recognition given to the Task Force by the first ministers, and noted that: "industry members on the Task Force felt strongly that a clear signal by the first ministers would demonstrate the government's commitment to move sustainable development from concept to action. Industry must now follow through and demonstrate its commitment."

Mr. Lecuyer stated that public concern over the quality of the environment has for many years been equal to concern over economic matters and that this is the true driving force behind the success of the Task Force's efforts. As a result of its work, a cooperative spirit is emerging among industry, environmentalists and government, he said.

The report has been recognized internationally as a major achievement. It was presented to the United Nations General Assembly in New York on October 19 and is now being widely distributed throughout Canada and around the world.

For more information or a copy of the Task Force report, please contact: Mark Stefanson, Chairperson, Task Force Secretariat, 960 - 330 St. Mary Avenue, Winnipeg, Man. R3C 3Z5. Phone: (204) 945-4742.

Wilderness

A Timeless Message

When the editors of *Borealis* first converged to set down the editorial formula for the new magazine, we were unanimous that there should be an essay in every issue. The question then became, who to start with?

We opted to look to the classics for the first essay. Who better than Aldo Leopold — an early advocate of a land ethic and a father of conservation — to premiere the *Borealis* 'Essay' section, we thought. Not surprisingly, Leopold's book, *A Sand County Almanac*, was selected as the most influential title in our *Borealis* Reviews Special Report, found in this issue.

We have selected from *A Sand County Almanac*, the essay "Wilderness," which Leopold compiled in 1947 from several previous essays. This was the year Leopold prepared his final draft, an expanded version of the *Sand County Almanac* manuscript, following seven years of publisher rejections. There was a feeling that such essays were not what the public wanted.

Originally, Leopold titled his book *Great Possessions* and it contained the essay "A Sauk County Almanac" (there never was a Sand County). On April 14, 1948, Leopold was notified by Oxford University Press that they would be pleased to publish the book. Seven days later, Leopold died of a heart attack while fighting a grass fire near his farm. He never saw the book in print.



Aldo Leopold.

Although we think of Leopold as either a forester or an applied habitat manager, the theme of wilderness was appropriate for his pen, for in 1924, as a young forest ranger, Leopold persuaded the U.S. Forest Service to set aside half a million acres of the Gila National Forest as the first designated Wilderness Area in the U.S.

Along with Robert Marshall and other conservationists, Leopold founded the Wilderness Society in 1935. He was part of the early conservation movement which advocated preservation of selective areas, for he had witnessed the disaster of the Kaibab Forest deer over-population which resulted from predator control, and he concluded that man cannot manipulate nature as easily as a conductor might wave his wand over obedient musicians, and that there was wisdom in leaving portions of the landscape wild, as a product of natural processes.

In 1947, the audience for Leopold's style of nature writing was in the minority, and Leopold knew it. In his forward to *A Sand County Almanac*, he wrote: "For us of the minority, the opportunity to see geese is more important than television, and the chance to find a Pasque-flower is a right as inalienable as free speech ... We of the minority see a law of diminishing returns in progress; our opponents do not."

Even though "Wilderness" was written nearly a half a century ago, the urgency of its plea has been reaffirmed in recent years, and closely parallels the mandate of the Canadian Parks and Wilderness Society. We reprint it here, for you in the minority, with faith that your views will prevail.

Jim Butler, Senior Editor

Wilderness

By Aldo Leopold

Wilderness is the raw material out of which man has hammered the artifact called civilization.

Wilderness was never a homogeneous raw material. It was very diverse, and the resulting artifacts are very diverse. These differences in the end-product are known as cultures. The rich diversity of the world's cultures reflects a corresponding diversity in the wilds that gave them birth.

For the first time in the history of the human species, two changes are now impending. One is the exhaustion of wilderness in the more habitable portions of the globe. The other is the world-wide hybridization of cultures through modern transport and industrialization. Neither can be prevented, and perhaps should not be, but the question arises whether, by some slight amelioration of the impending changes, certain values can be preserved that would otherwise be lost.

To the laborer in the sweat of his labor, the raw stuff on his anvil is an adversary to be conquered. So was wilderness an adversary to the pioneer.

But to the laborer in repose, able for the moment to cast a philosophical eye on his world, that same raw stuff is something to be loved and cherished, because it gives definition and meaning to his life. This is a plea for the preservation of some tag-ends of wilderness, as museum pieces, for the edification of those who may one day wish to see, feel, or study the origins of their cultural inheritance.

The remnants

Many of the diverse wildernesses out of which we have hammered America are already gone; hence in any practical program the unit areas to be preserved must vary greatly in size and in degree of wildness.

No living man will see again the long-grass prairie, where a sea of prairie flowers lapped at the stirrups of the pioneer. We shall do well to find a forty here and there on which the prairie plants can be kept alive as species. There were a hundred such plants, many of exceptional beauty. Most of them are quite unknown to those who have inherited their domain.

But the short-grass prairie, where Cabeza de Vaca saw the horizon under the bellies of the buffalo, is still extant in a few spots of 10,000-acre size, albeit severely chewed up by sheep, cattle, and dry-farmers. If the forty-niners are worth commemorating on the walls of state capitols, is not the scene of their mighty hegira worth commemorating in several national prairie reservations?

No living man will see again the virgin pineries of the Lake States, or the flatwoods of the coastal plain, or the giant hardwoods; of these, samples of a few acres each will have to suffice. But there are still several blocks of maple-hemlock of thousand-acre size; there are similar blocks of Appalachian hardwoods, of southern hardwood swamp, of cypress swamp, and of Adirondack spruce. Few of these tag-ends are secure from prospective cuttings, and fewer still from prospective tourist roads.

One of the fastest-shrinking categories of wilderness is coastlines. Cottages and tourist roads have all but annihilated wild coasts on both oceans, and Lake Superior is now losing the last large remnant of wild shoreline on the Great Lakes. No single kind of wilderness is more intimately interwoven with history, and none nearer the point of complete disappearance.

In all of North America east of the Rockies, there is only one large area formally reserved as a wilderness: the Quetico-Superior International Park in Minnesota and Ontario. This magnificent block of canoe-country, a mosaic of lakes and rivers, lies mostly in Canada, and can be about as large as Canada chooses to make it, but its integrity is threatened by two recent developments: the growth of fishing resorts served by pontoon-equipped airplanes, and a jurisdictional dispute whether the Minnesota end of the area shall be all National Forest, or partly State Forest. The whole region is in danger of power impoundments, and this regrettable cleavage among proponents of wilderness may end in giving power the whip-hand.

In the Rocky Mountain states, a score of areas in the National Forests, varying in size from a hundred thousand to half a million acres, are withdrawn as wilderness, and closed to roads, hotels, and other inimical uses. In the National Parks the same principle is recognized, but no specific boundaries are delimited. Collectively, these federal areas are the backbone of the wilderness program, but they are not so secure as the paper record might lead one to believe. Local pressures for new tourist roads knock off a chip here and a slab there. There is perennial pressure for extension of roads for forest-fire control, and these, by slow degrees, become public highways. Idle CCC camps presented a widespread temptation to build new and often needless roads. Lumber shortages during the war gave the impetus of military necessity to many road extensions, legitimate and otherwise. At the present moment, ski-tows and ski-hotels are being promoted in many mountain areas, often without regard to their prior designation as wilderness.

One of the most insidious invasions of wilderness is via predator control. It works thus: wolves and lions are cleaned out of a wilderness area in the interest of big-game management. The big-game herds (usually deer or elk) then increase to the point of overbrowsing the range. Hunters must then be encouraged to harvest the surplus, but modern hunters refuse to operate far from a car; hence a road must be built to provide access to the surplus game. Again and again, wilderness areas have been split by this process, but it still continues.

The Rocky Mountain system of wilderness areas covers a wide gamut of forest types, from the juniper breaks of the Southwest to the 'illimitable woods where rolls the Oregon.' It is lacking, however, in desert areas, probably because of that under-aged brand of esthetics which limits the definition of 'scenery' to lakes and pine trees.

In Canada and Alaska there are still large expanses of virgin country. "Where nameless men by nameless rivers wander and in strange valleys die strange deaths alone."

A representative series of these areas can, and should, be kept. Many are of negligible or negative value for economic use. It will be contended, of course, that no deliberate planning to this end is necessary; that adequate areas will survive anyhow. All recent history belies so comforting an assumption. Even if wild spots do survive, what of their fauna? The woodland caribou, the several races of mountain sheep, the pure form of woods buffalo, the barren ground grizzly, the freshwater seals, and the whales are even now threatened. Of what use are wild areas destitute of their distinctive faunas? There are now organizations and development groups actively embarked on the industrialization of the Arctic wastes, and plans even larger are actively being pressed. The wilderness of the Far North as yet has no formal protection and though still extensive, is beginning to dwindle.

To what extent Canada and Alaska will be able to see and grasp their opportunities is anybody's guess. Pioneers usually scoff at any effort to perpetuate pioneering.

Wilderness for science

The most important characteristic of an organism is that capacity for internal self-renewal known as health.

There are two organisms whose processes of self-renewal have been subjected to human interference and control. One of these is man himself (medicine and public health). The other is land (agriculture and conservation).

The effort to control the health of land has not been very successful. It is now generally understood that when soil loses fertility, or washes away faster than it forms, and when water systems exhibit abnormal floods and shortages, the land is sick.

Other derangements are known as facts, but are not yet thought of as symptoms of land sickness. The disappearance of plants and animal species without visible cause, despite efforts to protect them, and the irruption of others as pests despite efforts to control them, must, in the absence of simpler explanations, be regarded as symptoms of sickness in the land organism. Both are occurring too frequently to be dismissed as normal evolutionary events.

The status of thought on these ailments of the land is reflected in the fact that our treatments for them are

still prevailingly local. Thus when a soil loses fertility we pour on fertilizer, or at best alter its tame flora and fauna, without considering the fact that its wild flora and fauna, which built the soil to begin with, may likewise be important to its maintenance. It was recently discovered, for example, that good tobacco crops depend, for some unknown reason, on the preconditioning of the soil by wild ragweed. It does not occur to us that such unexpected chains of dependency may have wide prevalence in nature.

When prairie dogs, ground squirrels, or mice increase to pest levels we poison them, but we do not look beyond the animal to find the cause of the irruption. We assume that animal troubles must have animal causes. The latest scientific evidence points to derangements of the *plant* community as the real seat of rodent irruptions, but few explorations of this clue are being made.

Many forest plantations are producing one-log or two-log trees on soil which originally grew three-log and four-log trees. Why? Thinking foresters know that the cause probably lies not in the tree, but in the micro-flora of the soil, and that it may take more years to restore the soil flora than it took to destroy it.

Many conservation treatments are obviously superficial. Flood-control dams have no relation to the cause of floods. Check dams and terraces do not touch the cause of erosion. Refuges and hatcheries to maintain the supply of game and fish do not explain why the supply fails to maintain itself.

In general, the trend of the evidence indicates that in land, just as in the human body, the symptoms may lie in one organ and the cause in another. The practices we now call conservation are, to a large extent, local alleviations of biotic pain. They are necessary, but they must not be confused with cures. The art of land doctoring is being practiced with vigor, but the science of land health is yet to be born.

A science of land health needs, first of all, a base datum of normality, a picture of how healthy land maintains itself as an organism.

We have two available norms. One is found where land physiology remains largely normal despite centuries of human occupation. I know of only one such place: northeastern Europe. It is not likely that we shall fail to study it.

The other and most perfect norm is wilderness. Paleontology offers abundant evidence that wilderness maintained itself for immensely long periods; that its component species were rarely lost, neither did they get out of hand; that weather and water built soil as fast or faster than it was carried away. Wilderness, then, assumes unexpected importance as a laboratory for the study of land-health.

One cannot study the physiology of Montana in the Amazon; each biotic province needs its own wilderness for comparative studies of used and unused land. It is of course too late to salvage more than a lopsided system of wilderness study areas, and most of these remnants are far too small to retain their normality in all respects. Even the National Parks, which run up to a million acres each in size, have not been large enough to retain their natural predators, or to exclude animal diseases carried by livestock. Thus the Yellowstone has lost its wolves and cougars, with the result that elk are ruining the flora, particularly on the winter range. At the same time the grizzly bear and the mountain sheep are shrinking, the latter by reason of disease.

While even the largest wilderness areas become partially deranged, it required only a few wild acres for J.E. Weaver to discover why the prairie flora is more drouth-resistant than the agronomic flora which has supplanted it. Weaver found that the prairie species practice 'team work' underground by distributing their root-systems to cover all levels, whereas the species comprising the agronomic rotation overdraw one level and neglect another, thus building up cumulative deficits. An important agronomic principle emerged from Weaver's researches.

Again, it required only a few wild acres for Togrediak to discover why pines on old fields never achieve the size or wind-firmness of pines on uncleared forest soils. In the latter case, the roots follow old root channels, and thus strike deeper.

In many cases we literally do not know how good a performance to expect of healthy land unless we have a wild area for comparison with sick ones. Thus most of the early travelers in the Southwest describe the mountain rivers as originally clear, but a doubt remains, for they may, by accident, have seen them at favorable seasons. Erosion engineers had no base datum until it was discovered that exactly similar rivers in the Sierra Madre of Chihuahua, never grazed or used for fear of Indians, show at their worst a milky hue, not too cloudy for a trout fly. Moss grows to the water's edge on their banks. Most of the corresponding rivers in Arizona and New Mexico are ribbons of boulders, mossless, soil-less, and all but treeless. The preservation and study of the Sierra Madre wilderness by an international experiment station, as a norm for the cure of sick land on both sides of the border, would be a good-neighbor enterprise well worthy of consideration.

In short all available wild areas, large or small, are likely to have value as norms for land science. Recreation is not their only, or even their principal, utility.

Wilderness for wildlife

The National Parks do not suffice as a means of perpetuating the larger carnivores; witness the precarious status of the grizzly bear, and the fact that the park system is already wolfless. Neither do they suffice for mountain sheep; most sheep herds are shrinking.

The reasons for this are clear in some cases and obscure in others. The parks are certainly too small for such a far-ranging species as the wolf. Many animal species, for reasons unknown, do not seem to thrive as detached islands of population.

The most feasible way to enlarge the area available for wilderness fauna is for the wilder parts of the National Forests, which usually surround the Parks, to function as parks in respect to threatened species. That they have not so functioned is tragically illustrated in the case of the grizzly bear.

In 1909, when I first saw the West, there were grizzlies in every major mountain mass, but you could travel for months without meeting a conservation officer. Today there is some kind of conservation officer 'behind every bush,' yet as wildlife bureaus grow, our most magnificent mammal retreats steadily toward the Canadian border. Of the 6000 grizzlies officially reported as remaining in areas owned by the United States, 5000 are in Alaska. Only five states have any at all. There seems to be a tacit assumption that if grizzlies survive in Canada and Alaska, that is good enough. It is not good enough for me. The Alaskan bears are a distinct species.

Relegating grizzlies to Alaska is about like relegating happiness to heaven; one may never get there.

Saving the grizzly requires a series of large areas from which roads and livestock are excluded, or in which livestock damage is compensated. Buying out scattered livestock ranches is the only way to create such areas, but despite large authority to buy and exchange lands, the conservation bureaus have accomplished virtually nothing toward this end. The Forest Service has established a grizzly range in Montana, but I know of a mountain range in Utah in which the Forest Service actually promoted a sheep industry, despite the fact that it harbored the sole remnant of grizzlies in that state.

Permanent grizzly ranges and permanent wilderness areas are of course two names for one problem. Enthusiasm about either requires a long view of conservation, and a historical perspective. Only those able to see the pageant of evolution can be expected to value its theater, the wilderness, or its outstanding achievement, the grizzly. But if education really educates, there will, in time, be more and more citizens who understand that relics of the old West add meaning and value to the new. Youth yet unborn will pole up the Missouri with Lewis and Clark, or climb the Sierras with James Capen Adams, and each generation in turn will ask: Where is the big white bear? It will be a sorry answer to say he went under while conservationists weren't looking.

Defenders of wilderness

Wilderness is a resource which can shrink but not grow. Invasions can be arrested or modified in a manner to keep an area usable either for recreation, or for science, or for wildlife, but the creation of new wilderness in the full sense of the word is impossible.

It follows, then, that any wilderness program is a rear-guard action, through which retreats are reduced to a minimum. The Wilderness Society was organized in 1935 'for the one purpose of saving the wilderness remnants in America.' The Sierra Club is doing yeoman work toward the same end.

It does not suffice, however, to have a few such societies, nor can one be content that Congress has enacted a bill aimed at wilderness preservation. Unless there be wilderness-minded men scattered through all the conservation bureaus, the societies may never learn of new invasions until the time for action has passed. Furthermore, a militant minority of wilderness-minded citizens must be on watch throughout the nation and vigilantly available for action.

In Europe, where wilderness has now retreated to the Carpathians and Siberia, every thinking conservationist bemoans its loss. Even in Britain, which has less room for land-luxuries than almost any other civilized country, there is a vigorous if belated movement for saving a few small spots of semi-wild land.

Ability to see the cultural value of wilderness boils down, in the last analysis, to a question of intellectual humility. The shallow-minded modern who has lost his rootage in the land assumes that he has already discovered what is important; it is such who prate of empires, political or economic, that will last a thousand years. It is only the scholar who appreciates that all history consists of successive excursions from a single starting point, to which man returns again and again to organize yet another search for a durable scale of values. It is only the scholar who understands why the raw wilderness gives definition and meaning to the human enterprise.



What Do You Wear To The End Of An Epoch?

There are reasons enough to believe the party's over. Since Newton revolutionized our thinking, we have made nature our own. We have built dams, colossal cities, railways, ocean liners, and everyone's special favorite, the family car.

Now, however, we are being brought a succession of appalling bills. It seems we have also torn the atmosphere, fouled the rain, poisoned the oceans, and leached out the land. It's on its way out, this honky-tonk epoch of Man as Strawboss. At its peak, it was a spectacular aberration, marked by a feverish overspecialization in technology. Its achievements were as dazzling as its sins were black.

For a magazine coming to life at the end of this spasm of excess, and near the start of a new millenium, there are stimulating times ahead. There are a thousand issues into which to sink our teeth. Can we save the planet? And if we try, how much of our heroic intervention on its behalf can it stand? For it will take a while for humankind to abandon our heroic posture. The world view that supports it and the massive systems that attend it will not halt voluntarily. We won't surrender our supremacy until the earth demands we do so.

And we are already hearing those demands. The food we eat is threatened by chemical contamination. Ralph Nader puts the number of Americans who die every year from pesticide residues on food at 20,000. Our garbage haunts us, but our belief in the rightness of our scientific-economic ethic pushes us into ludicrous positions. When a man of science like Dr. Edward Goldberg of the Scripps Institute of Oceanography can say "our concern is to find the appropriate wastes for the appropriate spots in the ocean," we know something has gone wildly amok. According to Dr. Goldberg, the only reason we don't put more waste in the ocean is that we're bemused by what he calls the "Jacques Cousteau mystique."

Laying blame is pointless, outside the courtroom. If you ask the old judicial question *cui bono*, who benefits, the answer is plain. We all have reaped the rewards of our technological triumph. Guided by the spreadsheet and the lab, we have worked wonders. But as Marshall McLuhan said: "We shape our tools, thereafter, our tools shape us." Or in the more pointed words of Stephen Levy in Harper's "The spreadsheet is also a world view, a reality by the numbers."

Because it reflects its origins in the days of Newton, our world view has over-emphasized the demands of science and economics. And when the spreadsheet and the lab are the sole considerations in forming policy, real horrors emerge. American biologist Garrett Hardin has suggested we should never give food to starving countries to an extent that more people survive than the land itself can support.

So what is missing in our view of things? To Canadian historian Morris Berman, author of the dazzling work *The Re-enchantment of the World*, we must come to acknowledge a "participating consciousness," that sense of life in all things that made good ecologists of many primitive people. To thinkers like Berman and Gregory Bateson, the idea of participating consciousness must be restored in a way that is scientifically credible. Obviously, a swift reversion to some plastic neo-paganism will not work for people having our conditioning.

Our own science is already pointing toward a change in orientation, although proponents of classical physics don't like it much.

Work in quantum mechanics, such as Heisenberg's Principle of Uncertainty, suggests that despite the fact we are hotshot little calibrators, we can never know everything at a given time. And the pioneers of quantum physics have further eroded the underpinnings of our current science. Shrodinger's Cat and other delights of quantum theory say the experimenter and his process themselves affect the result. A science for a new millenium would have to accommodate those new perceptions. Newton examined the rate of acceleration of falling bodies. A new science, says Morris Berman, would study the relationships between the elements of the experiment and the mind that participates in it.

The early work in the direction of a new science has already begun. Physicist Evan Harris Walker has suggested every particle in the universe has consciousness. James E. Lovelock has postulated the Gaia Hypothesis, that the earth itself is a single living organism. (If Lovelock is right, we could presumably spend the first half of the next millenium apologizing!)

This revolution of thought may take hold of the public before any other. In fact, a move in this direction probably started in the '60s, the fledgling days of the movement to protect the environment. At that time, many westerners began to scrutinize the religions of the east, and of western native peoples. Here they found worlds of participating consciousness, where the me/you, mind/body, inside/outside dichotomies of western thought did not prevail. The music of the day reflected a changing orientation, and still does. "We are the World" is an anthem to the idea of participating consciousness, whether Michael Jackson wrote it that way or not. And it is not odd that artists, rather than scientists, should lead us into this age. Their function in the last age was sadly repressed.

There are 12 years to go before we toast the new millenium. At this time these arguments for a new world view may seem far-out and flaky. By 2000 A.D. they may have a grim legitimacy.

Fifty Books

Important to Conservation in Canada

By Ron Tibbett
Borealis Reviews Editor

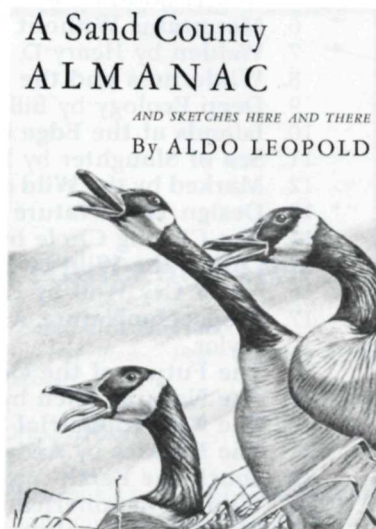
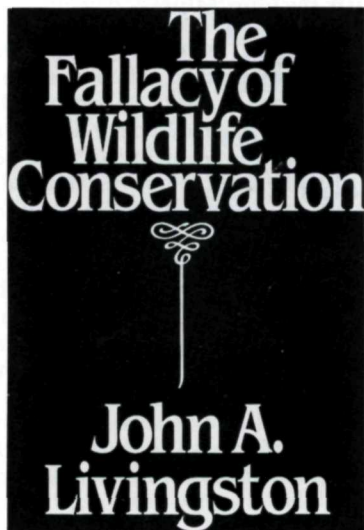
So ... what books do you think Canada's leading conservationists read?

That's exactly what the editors of *Borealis* wanted to know, because not only did we think it would be of great interest to our readers, but it would also comprise a priceless book list with which to gain a thorough understanding of our environment and its pressing concerns.

To find the answer, a questionnaire was forwarded to more than 50 of Canada's leading conservationists, from British Columbia to Newfoundland.

Each was asked to list their ten top choices by prioritizing them with point values ranging from ten to one, plus we also asked for their comments to explain the reasoning behind their choices.

The results were extremely interesting, and provide a golden list of the top 50 books, in order of importance, for anyone wishing to fill out their collection of the best writing currently available regarding our environment.



Influence was a key ingredient in the selections as respondents struggled to reveal those works, which over time, had most shaped their current personal perspectives toward the environment, and in many cases still provide those inspirations which motivate their day-to-day actions.

Noted national parks advocate, Mike McIvor, of Banff, Alberta, said he listed, "Works to which I return continually for inspiration," and he emphasized, "those books which reaffirm my beliefs, or challenge them, or provided a temporary stop along the way to 'think like a mountain'."

McIvor further stressed that the selections would change over time. "It would have been a different list yesterday and will be a different list tomorrow. Is the most important book the one that got you started or the one that is moving you now?" he asks.

In his own response, Dr. Jim Butler, Professor of Parks and Wildlife at the University of Alberta, stressed how interrelationships and progressions of influences are probably most impor-

tant, and that early childhood books are important considerations.

Butler suggested his selections were derived from the interplay of seven key variables:

1. Providing a foundation in early childhood for an emotional identification with and a caring for animals, (Saunders).
2. An affective (emotional) introduction to nature through literature, (Frost).
3. Selections which provided a sense of the order, wonder and diversity of living things, (Peterson, Brooks).
4. Selections which instilled a desire to travel, explore and view firsthand the best of wild places, and subsequently to experience how they are threatened to become aware of the urgency for action to save them, (Rourke, Peterson and Fisher).
5. An historical perspective concerning conservation issues and the urgency to address them, (Matthiesen).
6. A philosophical perspective and land ethic, (Leopold).



7. An awareness of and admiration for the dedication and commitment of our leading conservation figures, (Wolfe, Wild).

Some respondents chose to draw exclusively upon Canadian authors, while others expressed regret that not more Canadian works had influenced their final selections.

Dr. David Henry, of the University of Regina, a long-time conservationist and author himself, acknowledged the importance of "classics, such as Thoreau's *Walden*, Leopold's *Sand County Almanac* and Muir's *My First Summer in the Sierra* and their influence on the conservation movement in Canada," yet he omitted them from his listing in favor of suggesting "slightly less predictable titles."

One of Canada's most widely-respected ecologists, Dr. Stan Rowe, of the University of Saskatchewan, provided a highly thoughtful listing of references less-often used, leading with Neil Everinden's, *The Natural Alien*, and Carolyn Merchant's *Death of Nature*.

Other uncommon titles appeared from people with more specific orientations to the environment, such as Dr. Jon Lien of the Newfoundland Institute for Cold Ocean Science at Memorial University. As might be expected, Lien's listings were concerned with marine conservation, such as Elizabeth Borgese' *The Future of the Oceans*, and Bush's *The War Against the Seals*.

Bill Mason, noted filmmaker, painter and writer, forwarded from Quebec a well-considered list, which contained *The Holy Bible* as his third choice, following T.C. McLuhan's *Touch the Earth — A Self Portrait of Indian Existence*, and Sigurd Olson's *The Singing Wilderness*. Mason explained that "The world was and is created by God," and that his "passion for the natural world has grown out of this belief."

The listing of leading authors differs slightly from the order of first choice books for the simple reason that different works were often mentioned for the same author — John Muir being a good example. The ten authors who were most influential to Canadian conservation leaders in order of priority are:

1. Aldo Leopold
2. John Livingston
3. Rachel Carson
4. Loren Eiseley
5. Joseph Sax
6. Edward Abbey
7. Farley Mowat
8. Henry David Thoreau
9. Roderick Nash
10. John Muir

The book which has proven most influential to Canadian conservation leaders was *A Sand County Almanac*, by Aldo Leopold, and published by Oxford University Press of New York.

This was by far the winner in our survey, garnering twice as many points as the nearest contender. "It is the bible," said Dr. Steve Herrero, noted Calgary bear biologist and author of the

book, *Bear Attacks*.

Dr. Guy Swinnerton from the University of Alberta said it was "fundamental to the inclusion of ethics" in the field of natural resource allocation.

To Dr. John Theberge, of the University of Waterloo, and who recently chaired the Minister of Environment's Task Force on Park Establishment, Leopold's book offered,

Fifty Books Important to Conservation

- * 1. **A Sand County Almanac** by Aldo Leopold.
- 2. **Fallacy of Wildlife Conservation** by John Livingston.
- * 3. **Silent Spring** by Rachel Carson.
- * 4. **Immense Journey** by Loren Eiseley.
- * 5. **Desert Solitaire** by Edward Abbey.
- * 6. **Mountains Without Handrails** by Joseph L. Sax.
- * 7. **Walden** by Henry D. Thoreau.
- 8. **Wilderness and the American Mind** by Roderick Nash.
- 9. **Deep Ecology** by Bill Devall and George Sessions.
- 10. **Islands at the Edge** by Island Protection Society.
- 11. **Sea of Slaughter** by Farley Mowat.
- 12. **Marked by the Wild** edited by Bruce Littlejohn and Jon Pearce.
- * 13. **Design With Nature** by Ian McHarg.
- 14. **The Closing Circle** by Barry Commoner.
- * 15. **Call of the Wild** by Jack London.
- 16. **Never Cry Wolf** by Farley Mowat.
- 17. **Respect for Nature: A Theory of Environmental Ethic** by Paul Taylor.
- 18. **The Future of the Oceans** by Elizabeth M. Borgese.
- 19. **The Natural Alien** by Neil Everinden.
- 20. **The New Industrial State** by John K. Galbraith.
- 21. **The Rockies** by Andy Russell.
- 22. **Touch the Earth** compiled by T.C. McLuhan.
- * 23. **Wildlife in America** by Peter Matthiessen.
- 24. **World Conservation Strategy** by IUCN.
- 25. **Zen Mind Beginner's Mind** by Shunripu Suzuki.
- 26. **Celebrations of Life** by Rene Dubos.
- 27. **Cry the Beloved Country** by Alan Paton.
- 28. **Death of Nature** by Carolyn Merchant.
- * 29. **Limits to Growth** by Club of Rome.
- 30. **Men for the Mountains** by Sid Marty.
- * 31. **Son of the Wilderness: Life of John Muir** by Linnie Marsh Wolfe.
- * 32. **Story of My Boyhood and Youth** by John Muir.
- 33. **The Road Less Travelled** by M. Scott Peck.
- 34. **The Singing Wilderness** by Sigurd Olson.
- 35. **The Unsettling of America** by Wendell Berry.
- 36. **The War Against the Seals** by Bush.
- 37. **To Ride the Wind** by H. Albert Hochbaum.
- 38. **Alaska Wilderness** by Robert Marshall.
- 39. **America's National Parks** by Joseph L. Sax.
- 40. **Distant Waters** by W. Warner.
- 41. **High Stand** by Hammond Innes.
- 42. **In Trust for Tomorrow** by Tom McMillan.
- 43. **Man's Responsibility to Nature** by John Passmore.
- 44. **Moment in the Sun** by Robert Rienow and L. Rienow.
- 45. **My Family and Other Animals** by Gerald Durrell.
- 46. **Nature's Economy** by Donald Worster.
- 47. **The Appalachians** by Maurice Brooks.
- 48. **Working for Wildlife** by Janet Foster.
- 49. **Small is Beautiful** by E.F. Schumacher.
- 50. **The Quiet Crisis** by Stewart Udall.

*denotes a classic

"the only long-term solution to more harmonious man-land relationships."

John Tallmadge in his monograph, "Anatomy of a Classic" (in *Companion to A Sand County Almanac*), describes the work's lasting appeal:

"A *Sand County Almanac* has become a classic because of the way it arouses and holds our interest: by playing upon our expectations of what a nature book should be, by creating a dense but transparent style and an attractive but challenging narrative persona, and by conveying its wisdom in parables that change our angle of vision. To call it a classic, however, is not to say it is perfect, merely that it endures. It rewards rereading with increased delight and deeper, more personal instruction. Like Keats's Grecian urn, it works to tease us out of thought and into imagination, not by virtue of its contents but by the manner in which they are conveyed."

The second most influential title was John Livingston's, *The Fallacy of Wildlife Conservation*. *Borealis* contacted John Livingston at his cottage in Ontario. "I'm delighted," he responded. "I got a lot of flack from wildlife managers at the time."

Livingston's controversial book starts from the assumption: "In the broadest sense, wildlife preservation is a catastrophic, heart-breaking disaster."

Today, Livingston says the book was built on ideas he had been fostering and developing all his life. "It sounds like it was written in blood and it was."

Livingston has a number of books to his credit including *Birds of the Eastern Forest*. Now 65, he is with the Faculty of Environmental Studies at York University, and he is currently planning a sequel to *Fallacy*, of which he wouldn't divulge any details.

Silent Spring by Rachel Carson should be no surprise at number three on the list, for this is the book which signaled the emergence of the environmental movement as a popular force in society.

Edward Abbey's *Desert Solitaire* swept the continent when it was released, and it is encouraging to see the work of such a contemporary author in the company of such classics. So widespread is Abbey's influence, that a friend on a recent trip to the Kaibab National Forest in Arizona found the words, "Edward Abbey in 1988" inscribed on the walls of an outdoor 'biffy' in the forest. Abbey's influence seems to cross all barriers and his ranking should come as no surprise.

It is perhaps reassuring that literature remains a pervasive influence in the 1980s. And although the classics prevail, new works continue to emerge to influence the way we feel, live our lives, and relate to the Earth and all its creatures.

PORTRAITS OF EARTH FREEMAN PATTERSON



A KEY PORTER BOOK

Portraits of Earth

By Freeman Patterson

Key Porter Books, 1988, 180 pp., \$40.00, hardcover

Ron Tibbett

Patterson's new book is an exquisite expression of two guiding principles of his twenty years as a professional photographer and teacher: his dedication to photography as a fine art, and his deep concern for the preservation of our natural environment.

Combining 114 remarkable photographs (the book measures 10½ x 11½), with a fascinating text, Patterson takes readers behind the lens of the camera so that they can see Earth differently, to sense its natural designs, its shapes, lines, colors and textures.

The photographs represent the remarkable range and sensitivity of his work: from the barren icescapes of Ellesmere Island to the burning sands of the Namid Desert, and the lush rain-forests of the Pacific coast.

Of particular interest to photography enthusiasts are his discussions of natural and graphic design, the importance of light and color, and techniques of composition. Patterson demonstrates how making photographs of imagined landscapes can extend experience and enable the photographer to fashion new earthscapes that are a unique expression of thoughts and feelings.

PARKS FOR PROFIT

By Leslie Bella

Harvest House, 216 pp.

Victoria Maclean

This examination of our national parks' system is a jigsaw puzzle of a book, but one worth the energy required to put it together.

Its strength lies in its author's unwavering commitment to its basic premise — that the running of our national parks for profit has been both their shield and buckler and their greatest vulnerability. The book's weakness lies in a basic foggiess as to whom it is addressed, which is reflected in a convoluted organization of the material.

There are fascinating stories to be told in connection with the formation of our national parks system, and happily, Bella doesn't shy away from history, a discipline currently out of fashion.

The stories she tells are peopled by some great characters, some eccentric, most ambitious, but all convinced of the absolute righteousness of their position. Unlike too many academic writers, Bella is inclined to give the reader a good dollop of that color.

However, the impact of the unfolding story is limited by the format, more suited to a research paper than a strong narrative. This problem of format seems to arise from confusion as to whom the book is directed.

If it is to the small percentage of the Canadian population who are committed environmentalists, then the lure of the narrative is not so necessary. When you're preaching to the converted, you need only supply them with more facts and figures to arm them in the struggle.

But if your work is aimed at the general reader, other elements come into play, of which the need for color is only one. You must also guard against assumptions that the general public has a basic grounding in environmental issues. It doesn't.

For instance, Bella makes the statement "Elk Island Park is no longer profitable and can be the kind of park preferred by environmentalists." She leaves us hanging here, assuming we know just what it is environmentalists require in a national park. There are references to purists and their philosophies of parks but no delineation of those positions.

The general public is only vaguely aware of the arguments that rage between environmentalists, bureaucrats and businessmen, let alone the arcane debates that rumble between environmentalists and other environmentalists.

There is a lot of strong stuff in this book, some of it moving, some of it appalling, some of it funny. Some incidents blackly combine all three. For instance, Bella cites a blithe communication from a group of Revelstoke stalwarts, including the Revelstoke Retail Merchants Association, written in 1916:

"Anything you can do towards having an internment camp established here for the purposes of completing the auto road to the summit of the mountain will be highly appreciated by this community."

By all means, bring on the slaves!

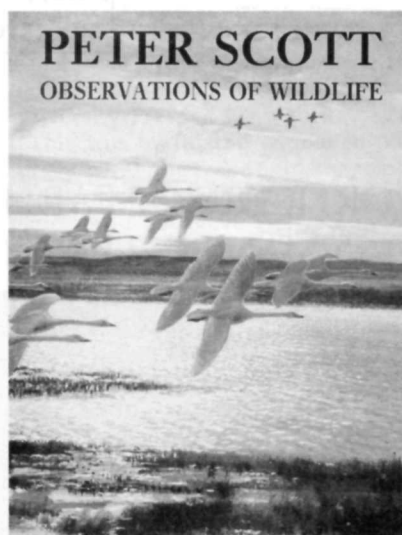
The miserable fact that so much of our western park infrastructure was built with forced labor is one of the book's most moving aspects, a bit of the national underbelly seldom examined. This work was done variously by relief workers, victims of depressions, interned Japanese and German POWs.

Bella digs into archival letters, reports and histories to give us a sense of their suffering. The only source she has ignored are the people who survive. This is understandable in a way as Bella was raised in the U.K., where the key historical players are nearly always quite dead.

But this is Canada, a toddler of a nation. Some of our early movers and shakers can still be found, in senior citizen lounges and nursing homes. Some new material in the form of interviews with old hands might have added texture to her account. A little of Barry Broadfoot's technique might have lessened the research paper flavor.

Throughout *Parks for Profit*, the reader is irritated by inexplicable breaks in the narrative. Its weakest point is organizational and some strong direction from a good editor at the outset might have made this a work of more sustained impact. As it is, however, a chapter on mining veers off into a subsection on timbering and then returns to mining. The chapter order keeps interrupting the various narrative themes such as the conflict between preservation and mining, or the ongoing saga of water diversion.

Despite these organizational problems, *Parks for Profit* passes the acid test: the average reader is better off for having read it, and the reader will find himself better attuned to the nuances of the continuing debate over national parks.



Observations of Wildlife

By Peter Scott

Phaidon Press, 1988, 112 pp., \$15.95, hardcover

Ron Tibbett

Sir Peter Scott has achieved fame as a painter of wildlife, as the founder of the Wildfowl Trust, and as one of the world's leading conservationists.

This book, (which uses 105 illustrations, 39 in color, and measures in at the coffee-table size of 8½ x 11), is both a collection of his paintings as well as a self-portrait of the man who created them.

Many of Scott's finest works are reproduced here along with some delightful drawings and sketches, while in the text he talks about his career as a painter, his work with the Wildfowl Trust, his efforts to save the earth's natural heritage, plus his many travels and interesting encounters.

In this magnificent series of paintings and drawings, Scott combines meticulous scientific observation with the artist's deep love of the natural world.

Few people have done as much for the conservation of wildlife as Scott, but his paintings have done even more. They communicate his enthusiasm, they open the eyes to the whole purpose of wildlife conservation by creating images of nature beyond normal experience or imagination.

His observations of wildlife will make you want to go and witness scenes like these for yourself, and then you will understand why he is so passionately concerned to prevent them from being swept away in the rising flood of humanity and technology.

Environmental Ethics:

Duties To and Values in the Natural World

By Holmes Rolston III

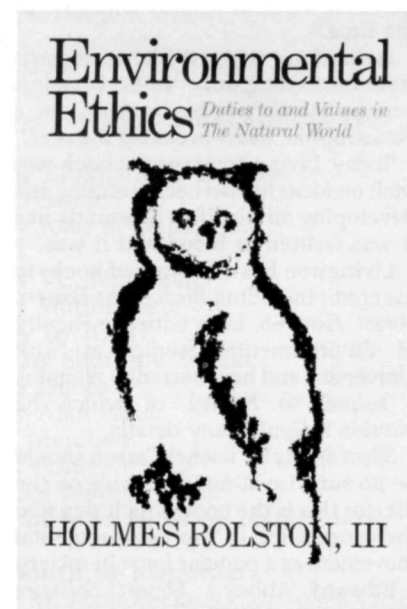
Temple University Press, 1988, 354 pp., hardcover

Elaine Butler

Holmes Rolston III is one of the two or three most important contributors to the relatively new field of philosophy called environmental ethics.

Over the past 10 years, he has written a number of ground-breaking papers on such subjects as value in nature and ethics towards nature (these can be found collected in *Philosophy Gone Wild* by Holmes Rolston III, Prometheus Books, 1986).

In his new book he gives us a complete systematic account of an environmental ethic and how it should be translated into public, business and personal policy.



Beginning with a discussion of the fourteen types of value carried by nature, Rolston goes on to analyze our duties towards other species and to ecosystems, to formulate an environmental policy and to provide rules to be followed in carrying out that policy through everyday decision-making.

However, it is not quite clear that this ethic is demanding enough to save the human race from itself, since for all that Holmes loves and appreciates the environment, he glorifies humans more and seems reluctant to demand some of the hard solutions that might too greatly inconvenience or annoy too many people.

Wilderness Tapes and Records

Jim Butler

Borealis Senior Editor

Canyon: Paul Winter is growing in popularity since its release in 1985. This is improvisational jazz, inspired by and recorded within the Grand Canyon. Winter's soprano sax, accompanied by cello, oboe and, at times, guitars, attempts to translate the spirit of the canyon into sound. (Available through the Moss Music Group, Inc., 510 Coronation Drive, West Hill, Ontario, M1E 4X6.

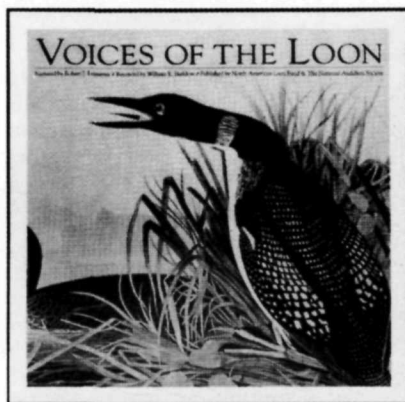
Nature's Choir: An Anthology of the Best Loved Prose and Poetry ...

About Birds. An unusual album of excerpts from many of the finest nature literary figures, including Leopold, Sigurd Olson, Thoreau, Whitman, Longfellow, Coleridge, John Burroughs and William Cullen Bryant. Proceeds are used to support the "Uncle Fogy Nature Area," owned and operated by the Association for Retarded Citizens of Minnesota. (Order through Camp Friendship, R.R.3, Annandale, Minnesota 55302).

Voices of the Loon. Introduction and loon call identifications combined with loon choruses, including one band of coyotes calling with loons. Printed and made in Canada. Published by North American Loon Fund, High Street, R.R.#4, Box 240C, Meredith, New Hampshire 03253.

Wolves and Humans. Offers a fine selection and range of wolf vocalizations recorded under natural conditions in Minnesota's Superior National Forest. The selections are enhanced by a mix of other voices which range from whip-poor-wills, Spring peepers, White-throated Sparrows and Barred Owls. Script is by Fred Harrington of the University of Halifax. Recorded in Dolby Stereo. (Available through the Science Museum of Minnesota.)

Whales Alive: Paul Winter/Paul Halley. More improvisational jazz inspired by, and composed using, the voices of Humpback Whales. Leonard Nimoy narrates. Artists' royalties for this go to World Wildlife Fund and whale conservation projects. A related album/tape *Callings*, also by Paul Winter, is a double-album which interweaves the voices of 13 species of sea mammals. Both are available through the Moss Music Group, Inc., 510 Coronation Drive, West Hill, Ontario M1E 4X6.



Crickets: Environments 5. An unusual stereo cassette that is much more interesting than it sounds. This relaxing background tape of cricket sounds would enhance any nature exhibit and transform any room into a peaceful natural scene. Other selections also available include *Slow Ocean*, *Ultimate Thunderstorm*, and *English Meadow*. (Syntonic Research, Inc., Mail Order Dept., 175 Fifth Ave., New York, N.Y. 10010).

Mountain Stream. A ninety-minute stereo recording of the natural sound of a rocky stream. Recorded among the redwoods of the Big Sur Mountains of California, this relaxing sound tape is enhanced by voices of morning birds and evening crickets. Other tapes in this Nature Recordings Cassette Library include *Sounds of the Sea*, *Thunderstorms*, *Dawn and Dusk: Sounds of the Ventana Wilderness* and other selections. (Inquire through Tape Masters, 176 Forest Ave., Pacific Grove, California 93950 (408) 373-6518.)

News and Notes

Endangered Spaces: This forthcoming book edited by Monte Hummel, President of the World Wildlife Fund (Canada), promises to reveal "a blueprint for the future of parks and wilderness in Canada." Hummel says he expects to receive 100,000 words from 20 authors by the end of October, 1988, which he will then whittle down to the final manuscript. Co-sponsored by the World Wildlife Fund and the Canadian Parks and Wilderness Society and published by Key Porter of Canada,

the book will be dedicated to the late Doug Pimlot, who conceived of the idea a number of years ago. Hummel says 20,000 copies will be printed and unveiled in the Fall of 1989 with "howitzers of publicity."

David Dodge

Restoring Degraded Ecosystems:

A state-of-the-art report on guidelines for restoring degraded ecosystems will soon be published by the Conservation Science Program, International Union for the Conservation of Nature (IUCN). This will be a valuable reading for policy and program staff at public agencies and, as well, for private groups and individuals concerned with the emerging science of ecosystem restoration. (IUCN Bulletin 19 No. 1-3).

Ted Mosquin

Sea Wind: is the name of the quarterly newsletter of the International Marinelife Alliance of Canada. The Alliance is dedicated to conserving the diversity of marine life. Memberships are available from Don E. McAllister (613) 996-1755 or write, IMA, 2883 Otterson Drive, Ottawa, Ontario K1V 7B2.

Ted Mosquin

New newsletter on tropical rainforests: The World Wildlife Fund (U.S.) has started a new newsletter: *Tropical Forest Conservation*. Write Jane Macknight WWF (U.S.), 1225 - 23rd St. N.W., Washington, D.C. 20037.

Ted Mosquin

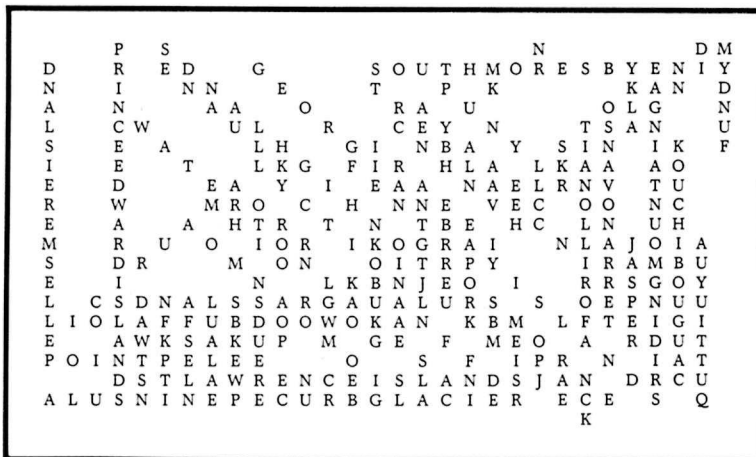
Mosses, Lichens and Ferns of Northwest North America: Published by the western-based Lone Pine Publishers, this book promises to redefine quality in Canadian-produced field guides. This is the first popular guide to mosses, lichens and ferns, and it is stunning. Inside are 370 species descriptions and 420 color photos. It is designed for the amateur and includes a unique habitat identification scheme, range maps, and a color-coded system to aid those of us who tend to be inept at identifying these mysterious creatures. We at *Borealis* have seen a copy, hot off the press, and have already lined up a review. The authors are Dale Vitt, Janet Marsh, and Robin Bovey. According to Lone Pine this is only the first release in a series, and the next publication will be *Mushrooms of Northwestern North America*. The book should be on the stands by the time you receive this issue of *Borealis*. It sells for \$24.95 and is available from Lone Pine Publishing, 414, 10357 - 109 St., Edmonton, Alberta T5J 1N3. (403) 424-1278.

David Dodge

Answers to Park Symbols Quiz

1. This is the symbol for a recycling container. Any items of garbage that can be used again would be placed here, such as glass bottles, aluminum cans and newspapers.
2. This marks a self-guided nature trail, great places to walk and learn more about nature.
3. This is an outdoor amphitheatre. Park naturalists present interesting talks here, often with slides or movies, and there is room for many people to sit and listen. Check at information boards or ask park staff about the time of the next presentation. They're usually in the evening after you have eaten dinner.
4. This is another type of amphitheatre symbol. Some park systems use their own variation of this symbol. This one is from Kananaskis Park in Alberta, where some of the 1988 Winter Olympic events were held.
5. This person looks to be having a difficult day. Some symbols are very specific to a particular place. This one, in Montezuma's Well in Arizona, warns people visiting Indian cliff dwellings to watch out for falling rocks and rattlesnakes.
6. This is a place to buy groceries.
7. A lone 'e' means that here is a special exhibit or display that is located outside near something special. The exhibit explains why it is special and lets us understand these things better. Don't miss too many 'e's or you'll miss why the park is so special.
8. This is a tough one. This is the symbol for environmental education. The lines say that we are part of our overall environment. This sign is used to show that a particular location in a park or forest is being used primarily for school groups to visit and learn about the environment.
9. In this symbol, a hiker is obtaining a permit to hike into a particular area of wilderness. Get your permits where you see this symbol. Permits are a good idea. They help rangers know how many people are in the backcountry and, therefore, prevent the wilderness from getting too crowded. It also helps rangers locate people who don't come out if they should be lost or injured.
10. How many of these did you get? The telephone is obvious. The question mark (?) indicates a place to go for information and where someone can answer your questions. Maps, bird checklists, nature books and exhibits are often found here as well, so this is a symbol well worth following up. The man standing beside the sign means that exhibits are found inside. The symbol on the right you should already know. Good luck from now on, finding your way around.

Answers to Parks Search



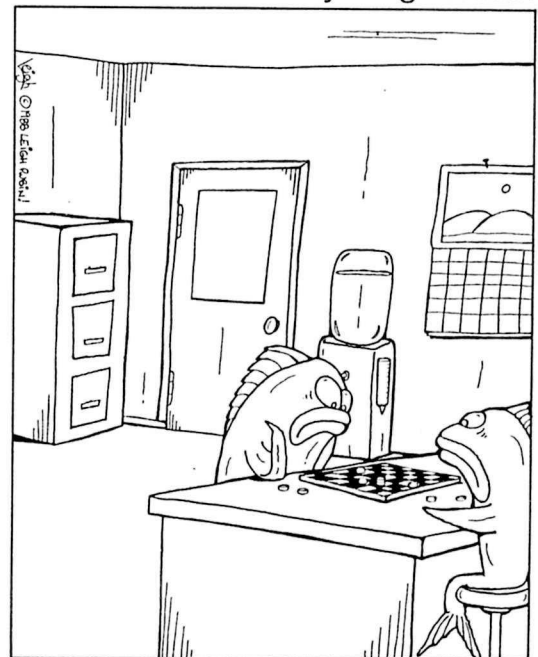
Closing Quote:

"It was late when I reached the cabin, and the sky was rosy with the sunset. For a last afternoon I had been a wilderness hunter, had feasted my eyes on a great brown swamp and a frozen river, had listened to a rapids and talked to the whiskeyjacks and chickadees. I had been an inspector of fence posts and had made the acquaintance of a field mouse. But, far more important than all of these, I had watched a last mallard climb into the sky and seen it head for the south.

Thoreau was at my side that night. "We should come home

Rubes®

By Leigh Rubin



Passing time at the Department of Fish and Game.

from afar," he told me, "from adventures and perils and discoveries every day, with new experiences and character."

*Siguard F. Olson from
The Singing Wilderness*



Today, protecting the environment
isn't an option.
It's part of the job.



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