



# Research Links

*A Forum for Natural, Cultural and Social Studies*

## *Gwaii Haanas* **Historic Industrial Sites Survey**

*Ian Sumpter and Lyle Dick*

Post-contact industrial activity in the park reserve has left a variety of signs on the landscape. Many ground surface features and habitation structures owe their existence to late 19<sup>th</sup> and early 20<sup>th</sup> century mining exploration, fishing, whaling, lumbering, settlement, and marine navigation/transportation. During the summer of 1999 Cultural Resource Services and parks staff will continue an inventory of historic industrial sites in Gwaii Haanas National Park Reserve. Together with sites surveyed in past years, these heritage resources document much of the post-European contact history of the park reserve area. Collectively, they tell a fascinating story of primary and secondary industrial activity, human occupation, early Haida-European encounters, and other topics. The purpose of the multi-year inventory project is to provide appropriate information and direction for each site regarding protection, management, and interpretation, and identify public safety concerns or other visitor management issues.

The recording of cultural heritage in the park reserve has been ongoing since the early 1970s. Although past survey programmes have noted industrial and structural features, it was not until now that an emphasis was placed on the inventory, evaluation, and detailed mapping of heritage sites of industrial origin post-dating 1860. This project began in 1996 under the direction of then-Parks Historian Jamie Morton. The first year of assessment was done around the Klunkwoi Bay area where investigations focused on an early 20<sup>th</sup> century copper mining camp and Lockeport, a salmon cannery/settlement established in 1907. In 1997, a larger field programme was carried out by Mr. Morton



*Photo: I. Sumpter*

*Figure 1: Helene Chabot stands beside a compressor and ore bucket pulley system at the 1901-1920s "Trust" Mine, site 973T, south shore of East Copper Island. These industrial artifacts and nearby mine shaft offer a number of resource protection and public safety issues.*

and field crew to examine the rich collection of mining, structural, and machinery features around Ikeda Cove and Harriet Harbour. Both areas were centres of large copper mining ventures, the former being Japanese-operated.

In the summer of 1998, the industrial site survey was continued under the direction of the authors. The 1998 field investigation continued to examine locales on the east

side of Moresby Island, encompassing the area stretching from the south shore of Skincuttle Inlet and extending northward to south side of Lyell Island. The 1998 field project was successful in the recording of 17 new sites and conducting condition-reviews at 10 previously known sites. Fifteen mining sites were inspected in the 1998 study area including a number former copper mines in the Skincuttle Inlet area dating between the 1860s to 1910s. Other post-contact sites investigated include salmon salteries in Jedway Bay and Huston Inlet, a clam cannery in Bag Harbour, a Japanese gravesite, three Haida habitation sites, and four Euro-Canadian residential structures. Inventory work proposed for the summer of 1999 will concentrate on early 20<sup>th</sup> century mines sites in the Klunkwoi Bay, Shuttle Passage, Carpenter Bay and Collision Bay areas.

In total, 31 post-contact sites have been recorded and their conditions assessed over the past three years. Over half of these sites present moderate to high potential hazards to the visiting public or park reserve staff. Hazards include: abandoned mine shafts and tunnels, industrial contaminants, undocumented basement features, jagged pieces of metal, rusty nails, rotten wooden features, unstable pieces of abandoned machinery, broken glass, and other risks. The dangers are particularly pronounced in the case of abandoned mining sites, with such features as unsealed and water-filled shafts and unstable adits or diggings with risks of rock collapse.

The survey/inventory programme encompasses three components, including pre-field, field, and post-field activities.

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# EDITORIAL

## Using the Past As a Management Tool

This issue of *Research Links* highlights several projects concerning cultural research and provides commentary on new directions in interpretation of cultural resources. These discussions point out that ongoing research and regular review of communication methods are as integral to proper management of cultural resources as is preservation of those resources. However, the implications of cultural resources research, preservation, and communication go beyond the resources themselves. In particular, in recognizing human history we should address the role of humans in the environment at large — both the effects of environmental changes on human cultures and the effects of human activity on the environment.

A better understanding of the past can help us see what management lessons were learned — what risks were taken, what mistakes were made, and what successes were achieved, often at large scales. The microblade technology that Arthurs mentions in this issue is a case in point. This was a long-term, highly efficient way of making sharp edges from small pieces of stone. It occurs from NE Siberia to NE Alberta. It is a human response to something, perhaps something as simple as poor availability of good rock, but in certain cases it appears to relate to fish processing. At some point microblades may even become a reasonable proxy resource indicator. The lessons learned are even more evident as we move forward in time. The boilers and mine shafts in Gwaii Haanas are landmarks of boom and bust economics, and remind us that even though there is no true untouched wilderness in the Americas since the last glaciation, some environments are resilient.

Before human historical studies with ecosystem relevance can take their place in parks management, the parks management system has to be ready to accept them. It is only in very recent years that human influences on park environments are integrated into ecosystem studies, and even more recently that the validity of carrying these approaches into the more distant past has been accepted. There is now far better recognition of the human component of ecological integrity. Nonetheless, there remains a need for development of policy in the area of recognizing human influences on ecosystems through time. In most cases this requires working closely with Aboriginal peoples towards ecosystem management goals. Discussions and participation with Aboriginal communities concerning the past and present roles of Aboriginal peoples in the ecosystem, including their traditional knowledge of ecosystem processes, are essential to directing management.

Communication vehicles such as *Research Links* are also necessary components of a management strategy, particularly within an organization such as Parks Canada that has a central conservation mandate. People need to hear about Parks Canada's perspective, and they need to hear that continued research is essential to improve management tools. Furthermore, as Klippenstein points out, communication approaches also need to evolve continually to keep up with changes in social awareness and even to help with social justice.

No doubt, we need better ways of measuring success and failure through all points in time. It is becoming clear that greater understanding of the past will help us devise better means of anticipating the future.

*Martin Magne*  
Manager, Cultural Resource Services, Western Canada Service Centre

# Archaeological Research at the Salmon Beds

*Invermere, BC*



*Photo: Larry Halverson*

*Above: Phyllis Nicholas, Columbia First Nation Elder (centre right), saying a blessing at the start of excavations.*

*Rod Heitzmann*

The Columbia River wetlands extend along the Columbia Trench just to the west of Kootenay National Park. This area is recognized an important ecological habitat and flyway for migratory birds in the spring and fall. The area is also significant as a wintering area for elk, deer, mountain goats and mountain sheep. Historically it was also productive for salmon in the 1800s (see side bar), and likely earlier as well. Dams constructed in this century now prevent the migration of spawning salmon.

The Salmon Beds are one of many locations in the Columbia Trench that are sources of interesting archaeological and ecological information. The site is located just downstream of Windermere Lake along the Columbia River. The valley floor is dotted with oxbow lakes and ponds and for much of the summer is covered by water. The Salmon Beds, themselves, are covered by water from May through to September.

For the last four years, archaeologist Rod Heitzmann, Western Canada Service Centre, Parks Canada, Calgary, has been investigating the role of humans in the ecosystem in Kootenay National Park. Research questions focussed on how long humans have been utilizing the park area, what kinds of activities were people undertaking and what kinds of resources (animals, plants, and stones) were being used. What kinds of environmental affects might people have had. Did they promote burning? Did their utilization of resources have other effects such as altering species composition?

During this Kootenay Archaeology Project, Mark Swindell, an amateur archaeologist in Invermere BC, was contacted. Mr. Swindell had systematically collected a unique assemblage of animal bones, including many that eroded from the Salmon Beds site. He generously permitted their photography and recording and encouraged excavation at the Salmon Beds. Species present in this collection included salmon, elk, bison, deer, mountain sheep, mountain goat, dog (*canid sp?*), bear, and beaver. Because of this unique collection of materials, the Salmon Beds offered considerable research potential.

Funding for archaeological testing at the Salmon Beds was provided by the Living Landscapes program, a special research program sponsored by the Royal British Columbia Museum and Columbia Basin Trust. This program made special funding available to researcher to investigate aspects of the Columbia River Basin of British Columbia.

The excavations at the Salmon Beds were designed to answer the following questions: How long has the site been occupied? What kinds of tools are present at the site, are they specifically for salmon processing or were other activities occurring at the site as well? Both bear and bison bones have been identified in the Swindell collection. Did the salmon attract bears as they do in so many other

## COLUMBIA BASIN *Spring Salmon*

In the spring of 1807, fur trader David Thompson established a new fort on the upper Columbia River named Kootenae House to trade with the Kootenay Indians. Throughout the spring and summer, he and his men had difficulty obtaining adequate food as game was scarce and the natives did not bring much meat to trade. Finally, about mid-August, one Native advised Thompson that it was time to build a weir on the river. Thompson followed the advice and began to catch salmon, including one that weighed 36 pounds. These were no ordinary salmon; they were Spring salmon who had travelled a vast distance up the Columbia River from the Pacific.

A letter from a fisheries official, written in 1940 to anthropologist Claude Shaeffer, says the last big smoke of salmon occurred at the Salmon Beds in 1884 when 50 tipis of people were encamped along the river. Shaeffer's Ktunaxa (Kootenay) informants remember the Salmon Beds as one of three major fishing stations along the upper Columbia River (Shaeffer Collection, Glenbow Archives).

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# AN AQUATIC BIOLOGICAL INDICATOR

## *to Monitor Organic Contaminants in Elk Island National Park*

Garry J. Scrimgeour, Dan Wicklum and Shelley Pruss

### WHAT ARE BIOINDICATORS?

What are bioindicators, and how can parks use them to help preserve ecological integrity? Bioindicators are typically plant and animal species that respond to changes in air or water quality, such as those produced by changes in land use, release of industrial discharges, or climate change. Essentially they act as “environmental canaries” like those used by coal miners to indicate poisonous air. Indicators can be divided into two groups depending on whether they reflect changes in biological diversity (Biodiversity indicators) or changes in environmental conditions (Environmental indicators), such as increased loadings of organic contaminants. Concentrations of organic contaminants in the environment need to be monitored because they can accumulate in the tissues of plants and animals. As a result of bioaccumulation, compounds become increasingly concentrated at higher trophic levels, occasionally reaching lethal levels.

Elk Island National Park (EINP), east of Edmonton, Alberta, is surrounded by intense agricultural activities and petroleum-based industries, which may threaten ecological integrity by introducing air or water-borne organic contaminants such as pesticides, polychlorinated biphenols (PCB's) and petrochemical compounds including polycyclic aromatic hydrocarbons. The proximity of EINP to potential sources of contamination increases the likelihood of bioaccumulation. EINP needs to monitor organic

contaminants using suitable biological indicators to ensure bioaccumulation does not threaten ecological integrity (Scrimgeour et al. 1997).

### SELECTING BIOINDICATORS

In 1996, EINP, the Friends of Elk Island Society and the University of Alberta initiated a study to determine whether leeches could be used as indicators of organic contamination in EINP and the larger Beaver Hills watershed (Scrimgeour et al. 1998). Leeches are potentially good bioindicators because they display several key characteristics: they are often abundant, large enough to be collected quickly, readily identified by non-specialists, known to accumulate many compound types and broadly distributed. Aspects of their life history are well known (Davies and Everett 1977, Peterson 1983, Metcalfe and Hayton 1989). However, several questions must be answered before an indicator species can be identified and used to monitor the ecological integrity of EINP, including: how are individual leech species distributed in EINP and in the larger Beaver Hills Watershed; which species are abundant enough to be sampled quickly and efficiently; how do contaminant levels in leeches compare with those of other members of the food web?

Field surveys of 16 lakes in EINP and several lakes outside the park identified 11 leech species. Five species were numerous and distributed widely enough to be identified as potential bioindicators. *Nepheleopsis obscura* was chosen as the potential indicator species because field surveys showed that it is widely distributed and abundant, and because considerably more is known about its distribution, abundance and life history than the other species (Davies and Everett 1977, Peterson 1983, Davies 1991, Dratnal et al. 1993).

Chemical analyses showed that PCB's, pesticides, including their breakdown products, and chlorobenzenes were present in leeches collected from within EINP and outside of EINP, but within the larger Beaver Hills watershed. The next, and perhaps the most critical step, was to ensure that organic contaminant levels in *Nepheleopsis* were representative of those found in other members of the food web. A bioindicator is useful only if it serves as a “benchmark” or “thermometer” for the environment. We must know how it compares with other species to estimate overall levels of contamination. Thus we compared organic contaminant burdens in *Nepheleopsis* with those in brook stickleback (*Culaea inconstans*) and the benthic freshwater shrimp *Gammarus lacustris*

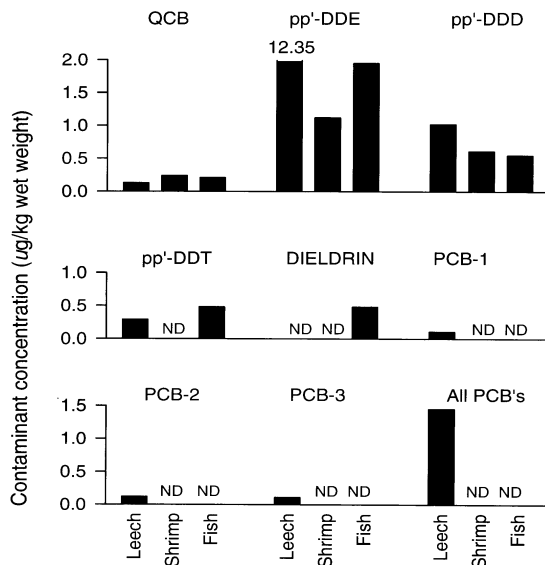


Figure 1. Comparison of selected organic contaminants from leeches (*Nepheleopsis obscura*), shrimp (*Gammarus lacustris*), and brook stickleback (*Culaea inconstans*) from Astotin Lake, Elk Island National Park, 1996. The chlorinated benzene is pentachlorobenzene; pp-DDE and pp-DDD are intermediate and final breakdown products of DDT, an insecticide that is no longer used in North America; Dieldrin is an insecticide; PCB's 1, 2, and 3 are different types of polychlorinated biphenols.

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# Documenting the Human History of Wapusk National Park

Patrick Carroll

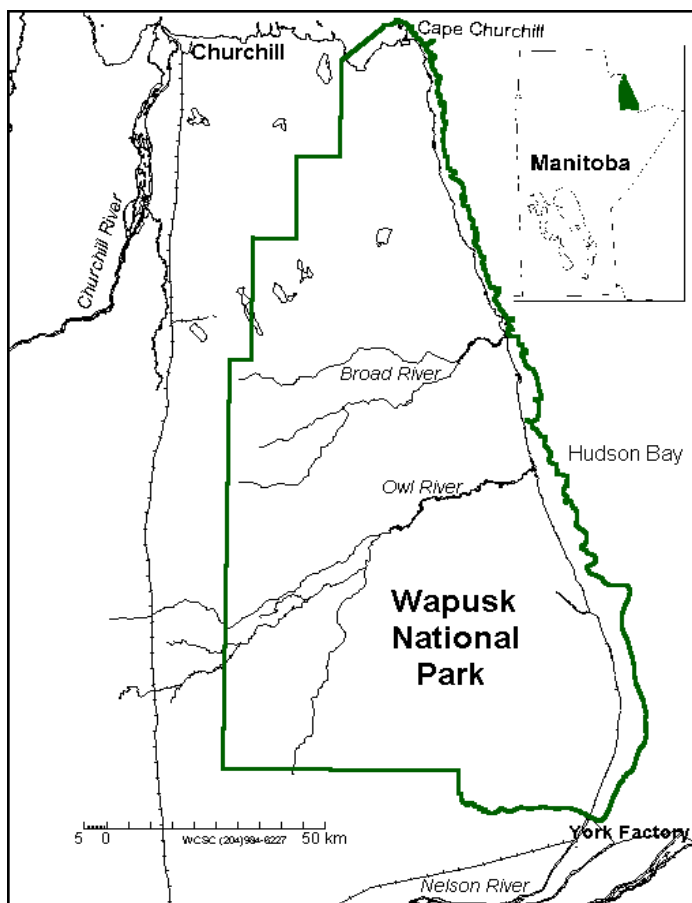
Wapusk National Park, in northeastern Manitoba, represents the Hudson-James Lowlands Region. The park is bordered by two of the most significant and most studied National Historic Sites in Western Canada, Churchill in the north and York Factory in the south, each representing more than three hundred years of continuous, documented history. The archaeological record of the area adjacent to the northern portion of the park dates from 1000-500 BC. Despite the wealth of historical information on the surrounding area, the history of the 11,475 km encompassed by Wapusk is virtually unknown. The purpose of the research was to conduct a preliminary review of documentary sources relating to the human history of the area within Wapusk National Park. Because very little has been written relating directly to the Wapusk area, our knowledge of the park's history and patterns of human use, at this stage of research, are inferred from the historical record for the surrounding area.

In 1998 the Western Canada Service Centre reviewed existing cultural resource inventories, databases, published and unpublished materials, and archival materials relating to Wapusk. The collected information comprises base line knowledge regarding cultural resources, and indicates areas where further knowledge is required. Information in the research report will be incorporated into management plans and park operations, and will help determine research priorities.

The review revealed some basic patterns for human use and occupation of the Wapusk area. Throughout the historic period (since European contact), the park was used as a travel corridor between the Churchill and Nelson Rivers as well as a primary source for game and other natural resources for neighbouring fur trade posts. The advent of the Hudson Bay Railway, in the early twentieth century, made the area more accessible and increased seasonal use, primarily for trapping and other subsistence activities. Overall occupation and use of the area declined in the 1950s with the closure of York Factory and the subsequent relocation of various York Factory First Nations. More recently All Terrain Vehicles (ATVs), snow-machines and aircraft provide relatively easy access for local residents.

The Wapusk area is not often mentioned in historical documents. Record keepers of the time did not consider the area an integral part of the day-to-day operations of a fur trade post. Trading parties arrived from upriver, whereas supplies came across the Bay from England. Individuals working for the Hudson's Bay Company generally travelled the coast aboard Company vessels. Increased settlement and the expansion of the fur trade into the northwest of Canada increased the number and variety of people arriving at, and moving between, the coastal posts. Much of our knowledge regarding the history of Wapusk comes from this period, beginning in the early 19<sup>th</sup> century.

Historical documents note the presence of Europeans at the Churchill River with the arrival of Jens Munk in 1619 and along the Nelson River as early as 1670. One of the earliest references to the Wapusk area was made by James Knight in September 1716. Anxious to have supplies shipped to the Churchill River where he was busily constructing Churchill Fort, Knight stated, "You not sending carpenters to finish the vessel I must be forced to go in the boat [to York Fort] and some of the men walk the shore" (Davies



Map: Tom Naughten

1965). Knight's comment is characteristic of the nonspecific nature of references to the Wapusk area.

The coastline was primarily used by natives employed by the Hudson's Bay Company to deliver messages between posts, as described by Andrew Graham in his "Observations" from 1767-91;

*And for packets...they are paid viz. from Churchill to York Fort which is 132 miles distance twenty-four beaver in goods...They also receive a gratuity from the fort they go to, and in the winter when they haul trading goods etc. are paid accordingly.*

As trade increased so did the need for provisioning to support the increasing population at the coastal posts. It was economical for the Hudson's Bay Company to augment the shipment of supplies with resources procured by local hunters. The role of post provisioner was quickly adopted by the Homeguard Cree. Victor Lytwyn (1993) states that "prior to the inland expansion of [Hudson's Bay Company] fur trade posts in the 1770s, the home territory, or hunting range of most Homeguard Cree was usually limited to about 100 miles from the coastal trading post." This territory,

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# Historic Industrial Sites Survey

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Photo: I. Sumpter.

*Figure 2:  
A corroded boiler on the beach  
fronting the former site of the  
1908-13 Bag Harbour Clam  
Cannery, 1455T, Moresby  
Island. Approximately 15  
people were employed in the  
cannery, including Japanese and  
Haida people. The clams were  
dug by both groups, primarily  
in nearby Burnaby Narrows  
and Island Bay.*

Potential industrial sites deemed worthy of investigation are first identified during a review of historic and archival literary sources, manuscripts, memoirs, maps, and photographs of the study area. This is then followed up with an in-the-field ground-truthing exercise. Once a site is located, a set of standardized information and management data is recorded. Data include a UTM location, site type, size, extant features, and materials and artifacts observed or recovered. Each site is photographed to show the site in relation to its surrounding environment and to assist in relocation. A scaled site map is also prepared showing the location of the site in relation to topographic features, the size of the site, and other relevant site characteristics. The post-field component includes documentation and analysis of the recorded field data, preparing site inventory records, cataloguing photographs and collected artifacts, and completing a written report. Further historical research is also carried out at this time to answer questions arising from the fieldwork, to enable an understanding of what is actually found on the ground, and how the cultural resources fit into their historical contexts.

The Gwaii Haanas industrial site survey

programme is contributing significantly to our understanding and interpretation of past land-uses in the park reserve. These sites are associated with the commencement of industrial activity in Haida Gwaii (Queen Charlotte Islands), a process that has had major impact on the history of the Haida peoples and the islands since that time. Among the important components of this story were the influences of waged labour into the Haida economy, the introduction of a series of infectious diseases with devastating effects, and eventual resettlement to Graham Island in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries. In the 20<sup>th</sup> century, the commercial packing of sea products at salteries and canneries, and timber extraction at various lumber camps in the archipelago extended the process of industrialisation to other primary products and site types. Furthermore, these sites are associated with the major industrial sectors of West Coast fishing, lumbering, and mining.

The industrial site survey programme will evaluate these site types for the purposes of cultural resource management and long-term protection, and identify public safety and other visitor management concerns. The focus of on-site activity for

this survey project has been on documenting former industrial sites to facilitate their proper management. The project has also presented data for park interpretive programmes so that the heritage value of these sites and the post-contact history of the protected area can be effectively communicated to park visitors and the wider Canadian public.

## ACKNOWLEDGMENTS

The authors would like to acknowledge the support of the Gwaii Haanas field unit for including this project in their cultural resource management programme. As well we would like to take this opportunity to thank four colleagues for their assistance and support during the 1998 field study: Barbara Wilson, Helene Chabot, Lee Edenshaw, and Patrick Bartier.

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# Biological Indicators

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## RESULTS

Comparisons of contaminant levels in *Nepheleopsis*, *Culaea* and *Gammarus* showed that the variety of detectable organic contaminants and their concentrations from one site in Elk Island National Park differed markedly among the three taxa, although the actual levels are low (Figure 1). Organic contaminant concentrations in *Nepheleopsis* were generally comparable or slightly higher than those in *Gammarus* and *Culaea*. However, differences in concentrations of organic contaminants among taxa are minor compared with the striking differences in the number of detectable contaminants. Analysis of *Nepheleopsis* tissues revealed up to twice as many detectable contaminants compared with other taxa, although these are present in low concentrations. These data suggest that *Nepheleopsis* is more useful as an indicator of overall organic contamination than *Gammarus* or *Culaea*.

## BIOINDICATORS & ECOLOGICAL INTEGRITY OF EINP

The ecological integrity of EINP could be threatened if the surrounding land activities of intensive agriculture and petroleum-based industries are a source of air and water-borne contaminants. Our data suggest that the integrity of EINP is not currently threatened by these activities because concentrations of chlorobenzenes, PCB's and chlorinated pesticides, herbicides and hydrocarbons in *Nepheleopsis* tissues from the Beaver Hills watershed were extremely low. In most cases, the concentrations were below analytical detection levels (< 0.05 ug/kg wet weight). Statistical analyses of four contaminants present in detectable concentrations, showed that concentrations did not differ between leeches collected within EINP and those collected outside EINP (but within the Beaver Hills watershed).

Our study indicates that levels of organic contamination in aquatic food webs of EINP and the surrounding watershed are

currently low. Now that useful baseline information has been established, EINP needs to implement a monitoring program to track contaminant levels within leech tissues through time. These data will allow EINP to use leeches as early warning indicators of imminent stress and will allow managers to rectify contaminant problems before they have marked effects on the ecological integrity of EINP. Elk Island, like other parks, is developing monitoring programs as part of their reporting obligations. Basic research and monitoring programs are required to identify ecological resources and potential stressors and to understand how parks need to be managed to maintain their ecological integrity.

## ACKNOWLEDGEMENTS

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Results shown in this article are based on a scientific article published in the Archives of Environmental Contamination and Toxicology (1998) 35: 565-572.

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# RESEARCH

## ALTERNATIVE METHODS OF SHORELINE MONITORING IN PACIFIC RIM NATIONAL PARK RESERVE

Shoreline monitoring is an important element in coastal zone management in Pacific Rim National Park Reserve (PRNPR). Monitoring enables managers to evaluate ecological integrity relative to reference indicators. Monitoring allows us to detect significant changes in ecosystems, and provides ecological information needed for early and pro-active management decisions.

Shoreline monitoring was initiated in PRNPR in 1997 in response to two significant factors: 1) visitation has been increasing at 4 - 7% annually (Statistics reveal that close to 1 million persons visited the Long Beach Unit in 1996); and 2) visitors have unknown impacts on the living plants and animals that comprise the exposed rocky intertidal ecosystem.

As part of this large-scale monitoring program, Elderhostel participants were invited to monitor the shoreline alongside Parks Canada staff. Using guidelines developed by the Department of Fisheries and Oceans, participants in this "Shorekeepers" monitoring program use quadrats and transects to obtain baseline information on distribution, abundance,

size, and population dynamics of the animals and macro-flora of the exposed rocky intertidal zone of the Long Beach Unit of PRNPR.

Participants pay to learn about the natural and cultural history of the Pacific coast and the challenges of coastal zone management from resource managers, park staff, and guest speakers. Through the "Shorekeeper's" monitoring program, Elderhostel participants perform monitoring duties and follow research methods to scientific standards, actively contribute to coastal zone management by conducting shoreline monitoring, and obtain this valuable data at no cost to Parks Canada (the cost of data collection is recovered through the fees paid by the participants). This form of ecological monitoring is self-sustaining.

This program, and others involving the public, leads to increased stewardship and support for ecosystem based management. Participants come away with an enhanced understanding of the issues, challenges and methods required to manage ecosystems in a sustainable manner, and can share what they learned when they return to their home communities.

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## ROCKY MOUNTAIN HOUSE HISTORIC MIDDEN ARCHAEOLOGY PROJECT

During September and early October of 1997 and 1998, Parks Canada archaeologist Peter Francis and assistant archaeologist John Porter have been systematically excavating an historic midden or intentional disposal area located between the sites of Hudson Bay Company (HBC) Fort 1835-61 and HBC Fort 1869-75 at Rocky Mountain House National Historic Site. In 1996, several large fragments of butchered bison leg bones found in a localized area of the erosion face of the north bank of the North Saskatchewan River initially alerted the archaeologists that a cultural deposit was under threat from the continuing erosion of the river bank. Initial subsurface testing confirmed that the deposit was associated with 19th century activities at Rocky Mountain House. An excavation strategy was initiated to try to bring into sharper resolution the age, historical and cultural context, and areal extent of the eroding deposits. The midden has now been designated threatened Level I (nationally significant) cultural resource because it is directly associated with the commemorative intent of the national historic site.



*Long Beach, PRNPR*



*Photo: Heather Holmes*

*Elderhostel participants in shoreline inventory*



*Photo: Heather Holmes*

*Quadrats along a fixed transect used in shoreline inventory*

*Photo: Dianne Willott*



# HIGHLIGHTS



## YA-HA-TINDA RANCH ARCHAEOLOGICAL SURVEY

Over the course of the field work in 1997 and 1998, twenty-eight 1x1 m units were excavated using standard archaeological techniques, revealing a rich and diverse assemblage of mid-19th century materials that represent the ways of life of the fur traders at Rocky Mountain House. The artefact assemblage includes ceramics (numerous clay smoking pipe fragments and earthenware fragments), glass (many fragments of bottle and pane glass and over 30 trade beads), lithics (gun flint fragments), and metal items (numerous hand-forged nails, roves, washers, awl and bit fragments, furniture tacts, blacksmith stock fragments, musket balls, a trade arrow point, a man's copper alloy ring, and a copper alloy religious medal known as a Miraculous Medal).

The project is scheduled to continue in 1999. The areal extent of the cultural deposit has not yet been determined. By the end of the 1998 field work, there had not been any diminishment in the density and diversity of cultural materials within the excavated units. It is hoped that selected artefacts will be incorporated into the displays within the national historic site's Visitor Centre.

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e-mail: peter\_francis@pch.gc.ca*

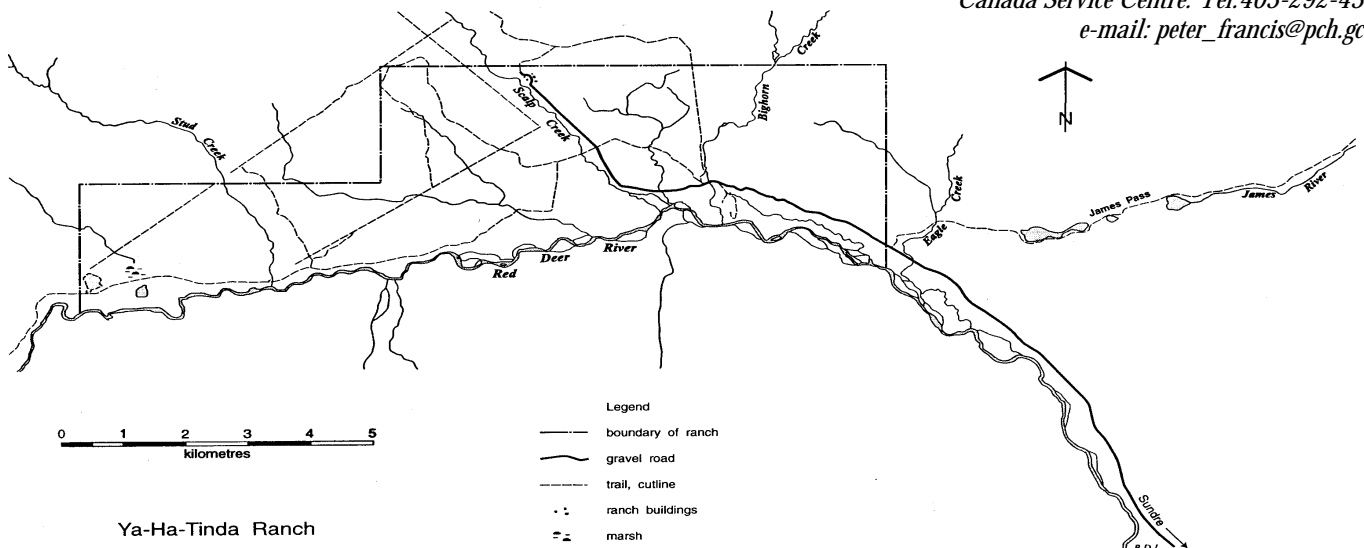
Prior to the Ya-Ha-Tinda Ranch Archaeological Survey, the Scalp Creek Threatened Sites Project, directed by Parks Canada archaeologist Peter Francis and completed in 1996, established multiple radiocarbon-dated cultural components within deeply stratified sites and a nearly 10,000 year record of discontinuous occupations on the Ya-Ha-Tinda Ranch. The following year, Francis initiated a multi-year project to systematically survey the federal crown leasehold. An inventory of cultural resources is a basic management requirement for lands administered by the Parks Canada Agency. The inventory of archaeological resources is also the first step toward the development of a comprehensive cultural resource management plan for the ranch. The 3,945 ha ranch, located 15 km east of the eastern boundary of Banff National Park in the Upper Red Deer River region, has been used to breed, train, and overwinter horses for the federal Warden Service since 1930.

Nearly 50 prehistoric sites had been recorded within the ranch boundaries since 1970. These are located principally along two broad valley terraces formed by the Scalp and Bighorn Creeks and the Red Deer River (see map). Beginning in 1997 and continuing in 1998, Francis, along with assistant archaeologist John Porter and student assistants from Simon Fraser University and the University of Calgary,

have focused field work on less high potential landforms away from the river terraces. In addition to a systematic transect survey strategy, the inspection of the several meandering horse trails that criss-cross the valley floor and the surrounding uplands has proven productive for site detection. Subsurface testing has augmented the evidence from surface finds at selected sites. Over 30 sites, both prehistoric and historic, have been added to the existing archaeological inventory during the 1997 and 1998 field seasons, including the remains of horse corrals and the footprints of several built structures associated with Brewster family activities on the ranch during the first decade and a half of this century.

This project is scheduled to continue in 1999. Coupled with evidence from the earlier Scalp Creek Threatened Sites Project, the Ya-Ha-Tinda Archaeological Survey is establishing that the land now encompassed by the ranch has a 10,000-year record of frequent use by hunter-gatherers prior to the advent of 20th century horse ranching activity.

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# All That Glitters

## *The Ancient Obsidian Sites of HooDoo Mountain, Kluane National Park*

David Arthurs

Since 1991, Parks Canada archaeologists have worked with staff and First Nations partners of Kluane National Park Reserve, southwest Yukon, to document the park's cultural heritage resources. The primary objectives of the multi-year archaeological survey are to examine areas of the park not previously inventoried, to evaluate the current condition of nearly 100 gold rush-related mining sites recorded between 1978 and 1982 (Stevenson 1982a), and, perhaps most important, to augment the inventory of resources documenting First Nations cultural history within the park boundaries. Two areas in the southern part of the park were investigated in 1998 - the Cottonwood Trail, and the Airdrop Lake valley below HooDoo Mountain (Figure 1; Arthurs 1999). The latter area is the focus of this research note.

### ANCIENT SITES OF HOODOO MOUNTAIN

Rising over a thousand metres above the confluence of the Jarvis and Kaskawulsh rivers in the central area of the park, HooDoo Mountain is named for the strange wind-sculpted pillars of grey volcanic ash on its slopes. Accompanied by Champagne and Aishihik First Nations guide and former Kluane Warden Ron Chambers and his husky, Klee, the author and Sharon Thomson spent seven days surveying the high alpine valley west of HooDoo Mountain. The valley is dominated by the conical plug of an extinct volcano, which towers above the razor-back ridge that forms its eastern wall (Figure 2). From it, spectacular ridges of grey and yellow ash sweep down and away toward the valley floor.

Previously, only 15 sites were known in the valley (Stevenson 1982b;

Ebell 1988; Arthurs 1995). One of these, the Airdrop Lake Site, was subjected to controlled surface collection in 1978

(Stevenson 1982b). Another, on the razor-back ridge just south of the volcanic core (Figure 2), was interpreted as the primary source of the obsidian (volcanic glass) used for toolmaking (Ebell 1988). Thousands of shattered obsidian fragments carpet the crest of this site, glittering like diamonds in the sunlight.

The 1998 survey recorded 27 additional precontact sites in a six square kilometre area of the upper valley. The sites lie in the shadow of the volcanic cone, and may relate primarily to the acquisition and preliminary processing of nodules of obsidian. Many of the sites are on high, rocky knolls with a good view down the valley, and the number of cutting and scraping tools associated with them suggests they may have served as hunting camps as well. This possibility is intriguing, as game is scarce on HooDoo Mountain today, and the findings may reveal information about a time when different environmental conditions prevailed.

Though small amounts of basalt, chert, and chalcedony occur, obsidian, collected from the ash ridges and stream beds that drain the east valley rim, is by far the prevalent lithic raw material on the sites. Obsidian is the sole material present on some sites. One site stands out as different, however; on a low knoll tucked against the east wall of the valley not far from the glacier at its head, this site yielded artifacts of lime green, yellow, and cream coloured cherts, translucent brown chalcedony, and other materials as well as obsidian. While some of these materials may be local, others are probably exotic. Investigation of this site has been limited, and its significance is unclear, but the presence of exotic material may suggest that non-local groups entered the area to collect obsidian.

No detailed study has yet been undertaken, and the age of the sites remains uncertain. Harvesting obsidian for tool-making by First Nations peoples may well have continued into historic times, but the presence of microblade tools, thin, razor-like implements whose manufacture required a specialized technology that is reasonably well dated (Figure 3), suggests that some of the HooDoo Mountain sites may be between 4500 and 7000 years old. Remarkably, the term for obsidian, "doo day" or "doo day ah," is still remembered in the Southern Tutchone language (Champagne and Aishihik First Nations 1996:6).

### RESOURCES AT RISK

The HooDoo Mountain sites are very fragile and easily disturbed. Most are on the surface, in loosely consolidated volcanic ash or glacial loess soils. Sites often lie exposed on the crests of knolls, unprotected by vegetation, or perched on the edge of creek banks or steep slopes, where they are eroded by wind or water.

There are other potential risks to these fragile resources beside erosion. For instance, on one site is an oval concentration containing unworked obsidian cobbles, cores, and the hundreds of stone flakes driven from them in the process of making stone tools. It perhaps preserves a single moment in time, as the flint knapper tested obsidian nodules gathered from the



Photo: David Arthurs

Figure 2. Conical volcanic core rising above the E. rim of Airdrop Valley. "Obsidian quarry" site lies on the saddle in foreground. HooDoo Mtn. is in the distant right of the photo.

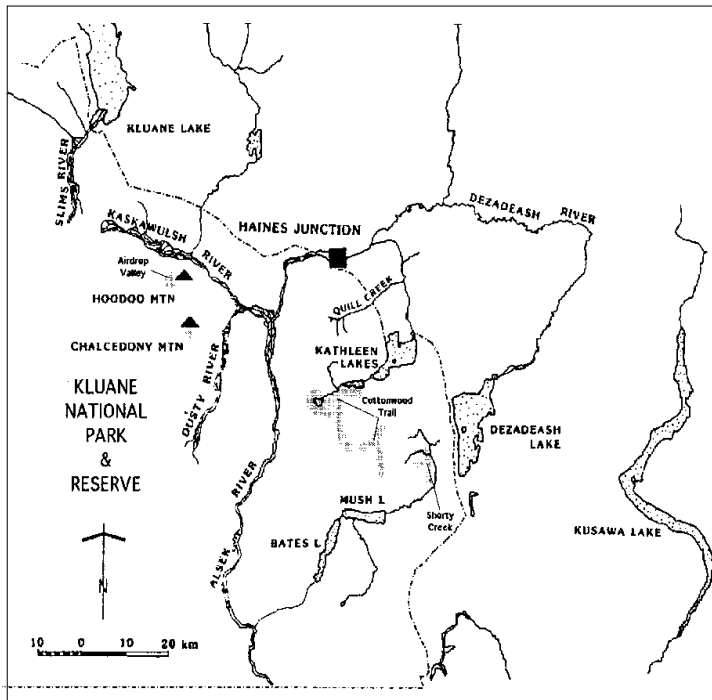


Figure 1. Kluane National Park Reserve, showing areas investigated in 1998

surrounding area to select the highest quality material to take away, and it may have lain undisturbed for hundreds or even thousands of years.

Although the interpretive potential of this "chipping station" is high, its exposed situation renders it extremely vulnerable to disturbance. Visitors walking across the knoll, treading on the artifacts or picking them up to test the sharpness of the brittle obsidian glass, would do irreparable damage to these resources, destroying their context and relationships - the very essence of their heritage value. Before the sites of the HooDoo Mountain area, which have been placed under Zone 1 protection, are made accessible to park visitors they must be painstakingly recorded, and strategies for their management developed. Additional survey is also required to document the full range of cultural resources in the valley.

## FUTURE DIRECTIONS

Though only preliminary, the 1998 survey revealed that there are many more sites in the Airdrop Lake valley than were previously known. The sites appear to include hunting campsites and toolstone gathering and processing stations intimately tied to geographic features and clustered around the obsidian source. The dense concentration of sites, their nature and distribution, and their relationship with dramatic geological features, suggest that the valley may represent an intact cultural landscape, and one of singular importance in the human history of the region.

The small amount of work that has been done on the sites suggests that the history of human use of the valley, and the harvesting of its obsidian resources, may stretch back some seven millennia. The preliminary investigations suggest the HooDoo Mountain sites have significant interpretive value, both within the context of Kluane National Park and the surrounding region, but are extremely fragile, and present considerable challenges for protection and management should they be made accessible to visitors.

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## FINGERPRINTING HOODOO MOUNTAIN OBSIDIAN

An adjunct to the present study is the sourcing of obsidians using Instrumental Neutron Activation Analysis. Samples of the glass are irradiated in a SLOWPOKE nuclear reactor, and the trace elements measured to arrive at a chemical fingerprint for each specimen. Prior to the current surveys, only two varieties of HooDoo Mountain obsidian had been recognized. Analysis of the translucent grey or black opaque obsidian artifacts from the sites discovered during the survey and natural cobbles from the streambeds that drain the valley rim suggests as many as six chemically distinct sources of volcanic glass may exist on HooDoo Mountain (Hancock & Pavlish 1996).

Small numbers of artifacts of HooDoo Mountain obsidian and other glasses currently unidentified as to geological source occur on archaeological sites across the southwest Yukon and beyond (Van Dyke & Jackson 1981). Some of the latter may be of the newly recognized HooDoo varieties. By identifying artifacts of HooDoo Mountain obsidian on these sites and tracing them back to their source, it may be possible to reconstruct the routes of exchange of this important commodity during ancient times.

## A NEWLY DISCOVERED ROCK STRUCTURE SITE

An unexpected bonus of the HooDoo Mountain survey was the discovery of a previously unrecorded rock structure site, brought to the attention of the survey crew by Trans North helicopter pilot Doug Makkonnen. Only the third such site known in the park, it lies on the south flank of Chalcedony Mountain in territory unexplored archaeologically. Similar structures are known from the west slope of the Airdrop Lake plateau, and from the mountain overlooking Mush and Bates Lakes. The pits, generally circular and about three metres in diameter, were created by removing cobbles from the surface of a rocky ridge or slope. Often the excavated rocks were piled around the depression to form a low wall. The pits occur either singly or in groups, on high points with a commanding view of the surrounding area. Though none has been extensively studied, these structures have been variously interpreted as hunting blinds, cache pits, or temporary shelters. Like the surprising number of habitation sites discovered in the Airdrop Lake valley, these features demonstrate that there is much work to be done in the high alpine area of the park before a comprehensive understanding of early human occupation and use of the area can be achieved.



Photo: Sharon Thomson

*Figure 3. A microblade tool. This artifact is of a cream-coloured chert, but obsidian specimens have also been found at sites in the valley.*

# Archaeological Research at the Salmon Beds

- continued from page 3 -

places and are these represented in the faunal assemblage? Does the bison bone truly represent a bison population in the past from the Upper Columbia Valley? If so, when did bison populations become extirpated? Can a sample of DNA be found for salmon at the site and are the salmon related to those from other river systems such as the Fraser/Thompson?

The excavations were scheduled for the time of lowest water levels, mid-March to mid-April. On a cold windy March 15, Ktunaxa elder Phyllis Nicholas said a prayer to the creator to bless the excavations. Throughout the next five weeks the crew excavated and screened the water saturated soils to recover a record of past use at the site.

During that time many local visitors stopped by the site and over 200 children took part in our school program. The program consisted of an introduction to First Nations plant use, an explanation of archaeological principles and a presentation of the excavations and results as they happened. Laverna Stevens of the Shuswap First Nation explained the significance of plants to First Nations people, especially those that were obtained in the wetlands. Bull rushes for example, provided materials for making baskets and mats. The roots and cattails were eaten. Were these materials also used at the Salmon Beds? Stacy Kozakavich, archaeology intern, Parks Canada, explained archaeological principles and Rod Heitzmann provided details on the goals of the project and on the results.

The site yielded a variety of projectile points, scrapers and other stone tools, numerous bone fragments, a fleshing tool

only small amounts of salmon bone were recovered and these may not be adequate to do the DNA testing proposed.

From this assemblage it is likely that this site was utilized primarily as a wintering site from which a variety of animals were hunted. The small number of fish bones is problematical, but may be due to preservation factors. Analysis and report preparation is now underway. The bone tools recovered indicates that bone objects formed a significantly larger component of the total tool assemblage than had previously been identified. The excavations at the Salmon Beds provide an indication of the importance of the upper Columbia River, and suggests that considerable more could be learned from this area.



Photo: Larry Halverson

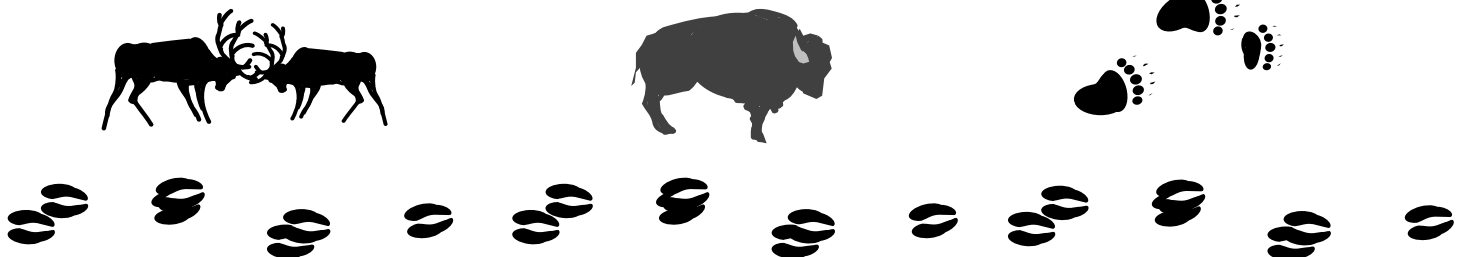
Rod Heitzmann screening the soil for artifacts at the Salmon Beds, Invermere, BC

made of bone, a bone bead, and a decorated deer tooth. These came from well-defined buried soils separated by water deposited silts and sands. Although identification of animal remains is still ongoing we have tentatively identified elk, deer, mountain goat and canid (dog or coyote). From the excavations only two fish bones were recovered. Numerous carbon and wood samples were collected, but these too await further analysis. From these we will be able to provide radiocarbon dates on several occupation levels at the site. The different species present will provide a better idea of the relative portion of different animal species used at the site. Similarly, the stone tool materials recovered will provide statistical data on the extent of use of the various stone materials. Unfortunately,

## ACKNOWLEDGEMENTS

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# Human History of Wapusk National Park

- continued from page 5 -

extending south of Churchill and north of York Factory, includes most of the landbase encompassed by Wapusk National Park.

In 1824, Archibald McDonald conducted the first documented journey through what is now the park area. McDonald was in charge of a group of 51 Selkirk settlers who were forced to land at Churchill in the fall of 1813. To secure shelter for the upcoming winter, the settlers had to make their way to York Factory where accommodations were available. McDonald kept a journal documenting the entire trip, and including local names for a number of their camping sites.

John West, the first protestant missionary to tour Rupert's Land, was the next individual to document his travels along the coast. In 1823, before returning to England, West travelled to York Factory then overland to Churchill to "meet the Esquimeaux Indians."

Two of the most important sources for information relating to Wapusk are the autobiographies of Bishop J.A. Lofthouse (1922) and George Simpson McTavish (1963). Joseph Lofthouse arrived at York Factory in the winter of 1884 to replace the Reverend G.S. Winter. In 1886 Lofthouse moved to Churchill and established the first mission where he remained until 1889. Lofthouse's book describes many trips overland between York Factory and Churchill.

George Simpson McTavish's memoir is undoubtedly the single best document for the entire Wapusk area. Simpson recounts his experiences working at Churchill post from 1878 to 1889. He talks at length about his extensive travels along the coast, both as an HBC employee and for pleasure. His many anecdotes and general knowledge of the region are important sources of information. Often dealing with specific events, locations and people, McTavish's accounts present a clear picture of one aspect of the history and human use of the Wapusk area at the end of the nineteenth century.

The written record is only one aspect of the research process. In this instance historical documents have been used as an initial step toward identifying patterns of human activity in the Wapusk area. We are now able to recognize the pre-contact period as one of the gaps in the documentary record for Wapusk. The history of aboriginal land use is also poorly documented for this area.

A map recorded by Peter Fidler entitled "A Sketch Drawn by a YF Indian When I passed Owl River 29th July, 1809," illustrates our incomplete knowledge of aboriginal land use within Wapusk. The map represents one of the first detailed representations of the

Wapusk area. It is a rough outline of the coast from the Churchill River to the Nelson River focusing on the Broad and Owl rivers. The map includes geographical information including the location of wooded areas, shoals, relief; comments on the navigability of the two rivers; and native names for a number of the lakes. Several distances between locations are noted as "30 miles" or "2 Days walk." Fidler's map, "Drawn by a YF Indian," is the only documentation of his trip along the coast and was constructed entirely from information provided by the native informant. Therefore, this map may represent a contemporary, and rare, aboriginal perspective of the coastal region; a cultural perspective not otherwise encountered in the historical literature for this area. The various trails suggest regular use of the inland areas between the coast and the "little Churchill river." This perspective of land use is contrary to the concept of a north/south travel corridor which prevails in fur trade documents. It is also contrary to the tendency for historical literature to focus upon the Churchill and Nelson Rivers. Only with further research can Fidler's map be interpreted as evidence of aboriginal land use patterns. It is presented here simply as another piece of the puzzle surrounding the elusive history of Wapusk National Park.

Prior to this research, no comprehensive document existed discussing the human history of the coastal region between Cape Churchill and the Nelson River in northeastern Manitoba. This research has revealed to us how little is known about the human history of this area. A summary of the research results is contained in a background report produced by Parks Canada. An archaeological survey was conducted in the summer of 1998 (report in progress) to survey and evaluate high-traffic areas and collect information to be incorporated into an historical land use model for the park. Archival research will be augmented by Traditional Knowledge. A Parks Canada sponsored oral history project by the Arviat Historical Society to collect Inuit land-use knowledge of the Churchill area has been expanded to include Inuit knowledge of Wapusk. Continued archaeological and historical research in this area by Parks Canada staff will increase our knowledge of the history of Wapusk and provide us with a clearer understanding of the human use and occupation of the entire coastal region.

*Patrick Carroll is Assistant Collections Registrar, Western Canada Service Centre*

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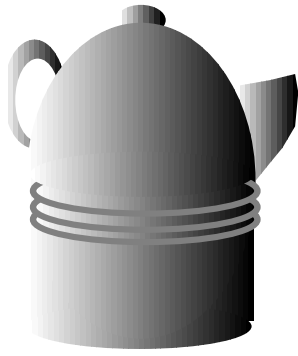
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# POD

## On a New Approach to at National H

*Frieda Esau Klippenstein*

Interpretation programming at Parks Canada's national historic sites has characteristically been grounded in single, authoritative storylines. Success has been measured by how consistently we deliver a well-researched, unambiguous chronology of events around approved themes, where all likely questions are anticipated and answers prepared. But the Cultural Resource Management policy (Parks Canada 1994) calls for a remarkably different approach:

*Parks Canada will present the past in a manner that accurately reflects the range and complexity of the human history commemorated at or represented in a national historic site, historic canal or national park.... History will be presented with integrity. This will include the presentation of differing contemporary views, perspectives informed by traditional knowledge and later interpretations (1.5.1)*

The policy also states that in our commemorations "we will not play the role of arbiter of Canada's human history." This is a rather brave statement considering that all the decisions about what people, places and events are of national significance, as well as what is communicated about them, are made within the system. In reality, historians, exhibit and multi-media designers, and site interpretive staff routinely organize "information" gathered from an array of sources into linear storylines through sets of judgements that are personal and idiosyncratic, even while they are patterned. In western historical tradition, some historical accounts achieve the status of official versions of an event. These versions gain authoritative power over time and shape the collective memory. In them a chorus of individual voices are

reduced to some consensus. Presentation programming at national historic sites has drawn on and helped create official versions of Canadian history.

The biases inherent in historical narratives become evident upon reflection. Perhaps the voices of consensus are actually the loudest voices—those with enough power to come to the forefront. For example, First Nations Elders in Saskatchewan and northeastern Alberta point out that, in the national commemoration of the "North West Rebellion" of 1885, there is remarkably little attempt to explain the actions of the First Nations people, or to place the "rebellion" in a wider context to shed light on their motivations. Rather, it focuses on how the First Nations were subdued and the government forces triumphed. This one-sided approach is not surprising. After all, the sites were commemorated by a national agency as national sites, for national purposes. The underlying message at the sites is that, although it was violent and unfortunate, Canada needed to take drastic measures against the Métis and First Nation "rebels," because they were a threat to the settlement of the West and the building of the nation.

National Historic Sites have always had mandates outside of the simple imperative of fairly telling a story. The programme has been utilized to inculcate nationalism, unity and patriotism; to communicate environmental messages; and to perpetuate a sense of Canadian identity. Well-meaning members of the programme may now be anxious to "correct" this by revising exhibits, rescripting written guides and oral tours, and inserting new material at our sites to "balance the perspectives" and "neutralize bias." But are we any further ahead if our "updated" sites have in essence simply replaced one authoritative storyline with another?

A "multiple perspectives" or "many voices" approach may be a more effective way to fulfill the above-noted policy.

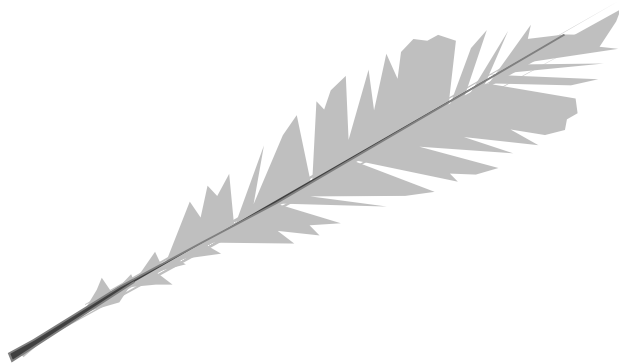
While some might argue that bias can be eliminated from historical interpretation by presenting only the bare "facts" or "objective truth" of an event, it is well to remember that history is really story. Whatever media it is preserved in, an account of an event is always someone's truth. While we ask what really happened? it becomes equally essential to ask who is the source of an account? and, what meanings did the event have for the storyteller?

In a many voices context, visitors understand a site and its messages through a collage of vivid stories and images rather than one authoritative description and explanation of an event. It is reminiscent of some aspects of First Nations historical tradition. Though not uniform across all groups, one of the unique features of Native oral tradition is the idea that a person or group can tell only that part of the story that they have authority to tell, so each voice adds a component. The total picture of an event, then, requires a collage of these tellings.

A many voices approach is similarly personal and multi-dimensional. It brings out the array of human impacts of a particular physical landscape, issue or event. The approach recognizes the validity of various perspectives on an historical event without having to synthesize them, or to judge which are most "true" in order to weed out contradictions. It concedes that historical accounts are constructions, posited by individuals, parties, or whole sectors of society for their own conscious or unconscious purposes. And the many voices approach requires much more involvement from individuals and groups connected with the story to contribute authentic expressions of the multiple meanings of a person, place or event.

To "own" their history, perhaps people must participate in it. Canada's national historic sites could be centres where constructive discussion and questions are

## Heritage Presentation Historic Sites



encouraged. The sites could also provoke reflection on the historical process itself — on how historical narratives are created, and how pieces of a story are brought together through archaeological evidence, oral tradition, historical documents, etc. to create a larger picture. However, such an approach requires new methods, timelines, relationships and starting points. New media—emphasizing drama, dance, song, video or voice recordings, and relying less on written texts—may be required.

What form can a many voices approach take at a site? We can go to some of our own sites for models. Plans at the Fur Trade at Lachine NHS (Montreal, Quebec) were for a selection of audio tours to be offered, each featuring a different character's voice and accompanying perspectives on the topic of the 19th-century fur trade in the area. Similarly, at Batoche NHS (Batoche, Saskatchewan) a multi-media presentation dramatizes the conflicting perspectives that led the Métis into battle with the Canadian government in 1885. Another approach might be to leave a site largely as it is, while pointing out the perspective it reflects. Overlays of commentary could be added through drama, audio tours or vignettes, to create a dialogue illustrating differences in views and historical traditions. Similarly, a site could be packaged and advertised together with another heritage centre presenting a notably different viewpoint, again provoking thought and dialogue.

A key tenet of the many voices approach is to maintain the connection between story and storyteller. Some may argue that is the central feature of the widely embraced living history approach, in which interpreters role play specific historical characters to bring them to life. While this is true, living history sites require so much attention to physical infrastructure

that the themes and key messages are often less memorable than the exotic people, glamorous backdrops and curious gadgets of a past age. Baking cookies, making barrels, and other technique-based activities may contribute to the right aura at the site, but can easily become diversions to visitors understanding a site's national historic significance.

A successful many voices approach has a very different focus. The imperative of achieving commemorative integrity places a premium on communicating the key messages. Period costuming, period panoramas and first person speech of the living history approach could be adapted to achieve this goal. Fort Langley NHS, for example, is finding new ways to look at the infrastructure and vast array of resources accumulated through years of a living history approach. They have resolved to see it all as interpretive devices. If the sites' resources are essentially props to getting the historic messages across, and not primarily for recreating a highly specific, large-scale environment, then there is considerably more freedom to use a wide variety of heritage presentation media and devices. Fort Langley is working toward a programme featuring storytelling, period panoramas, a hands-on children's activity area, exhibits, directed viewscapes, vignettes, slide/video presentations, and an audio tour that allows an array of voices to express parallel, intersecting and sometimes contradictory memories and ideas. The flexible components of this approach are less time bound and less likely to divert the visitors' attention from the historic messages.

A recent Parks Canada Heritage Presentation Renewal initiative calls for new efforts and resources to be applied to interpretation and outreach programming

at our sites. Adopting a multiple perspective approach in our commemorations can increase interest and public buy-in, and resolve some nagging historiographical problems. However, several considerations must also be weighed. In presenting the viewpoints of others, we can not simply put words into their mouths, attributing attitudes and perspectives that they ostensibly would have had. We need to develop real relationships with people who have personal connections to the sites, inviting and allowing their long-term, ongoing input. We also need to deal with the reality that historical perspectives will be contradictory at times. And whether we like it or not, a considerable segment of our visitors take comfort in a single, clearly-told account. Not all visitors will easily understand the genre of "many voices." Without effective explanation and balance, visitors who simply do not understand may even blame modern day curators and historians for offending perspectives in a presentation. And finally, does a many voices approach really solve the problem of bias? Ours is still a system where national significance is defined and key messages articulated within the programme. Even if we allow more voices a forum, we must recognize how our mandate to organize around a site's commemorative intent affects the discourse.

Clearly we need to proceed toward revising national historic site presentation strategies with careful discussion, reflection and study in order for us to fulfill the policy directives and successfully make the transition to a more thoughtful and effective approach.

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# MEETINGS OF INTEREST

August 25-27, 1999

**Ecology and Management of Ungulates: Integrating across spatial scales.** Prestige Lakeside Resort - Nelson, BC. In a three-day conference, biologists and managers will share information on the challenges of integrating information about the ecology and management of ungulates across spatial scales. The conference will focus on topics related to foraging at the scale of the individual, ungulate use of heterogeneous landscapes, linking population management to landscape management, and the role of ungulates in ecosystems. The early registration deadline is April 15, 1999. Registration materials and information on accommodation are available through: Karen O'Reilly, NCASI, Box 458, Corvallis, OR, 97339; Tel: (441)752-8801; fax: (441)752-8806; koreilly@wrc-ncasi.org, or on the website: <http://wildlife1.uwsp.edu/ungul99>

September 23-25, 1999

**1999 Society for Ecological Restoration International Conference.** Presidio of San Francisco, CA. Stewardship, science, art and practice are the fundamental elements of ecological restoration. These elements will be brought together by restorationists from around the world. The plenary symposia are: restoration on public land; watershed planning and politics; community, connection and stewardship. Field trips and special workshops will precede and follow the main conference. The early registration deadline is July 23, 1999. For information or a registration brochure, contact: Society for Ecological Restoration, 1207 Seminole Highway, Suite B, Madison, WI 53711, USA. Tel: (608)262-9547; fax: (608)265-8557; e-mail: [ser@vms2.macc.wisc.edu](mailto:ser@vms2.macc.wisc.edu)

September 29-30, 1999

**Managing the Forests for Lichen: The Mountain Caribou Issue.** Revelstoke BC. This workshop will focus on managing forests for the high lichen biomass required by mountain caribou. Participants will discuss the latest findings about lichen ecology, mountain caribou requirements, and forest management practices. The workshop will consist of a full day of presentations and a half day field trip to the Keystone Pastch Cuts, the first area harvested in the Columbia Forest District with the objective of balancing timber extraction and caribou habitat maintenance. To register or for more information, call: (250)837-9311 or e-mail: [cmi@junction.net](mailto:cmi@junction.net); web site: [www.cmia.org](http://www.cmia.org)

November 2-3, 1999

**Fourth Annual Roads, Rails and Environment Workshop: "Impacts and Solutions for Aquatic Ecosystems."** Revelstoke, BC. The Columbia Mountains Institute of Applied Ecology (CMI) is pleased to invite presentation submissions for this workshop. The workshop is intended for an interdisciplinary audience of biologists, engineers, rail and highway crews, managers, conservationists and all those with an interest in sharing information in how our transportation systems and aquatic ecosystems interact. This year, we are focusing on practical solutions to impacts of roads and highways on aquatic environments. Presentation topics may include: water quality and quantity, bioengineering techniques, fish passage and barrier mitigation, wetlands, culverts, etc. Submissions: Karen Bray: PO Box 500 Revelstoke, BC V0E 2S0, Tel: (250)837-2538, fax: (250)837-9600. [karen.bray@bchydro.bc.ca](mailto:karen.bray@bchydro.bc.ca). Registrations: Columbia Mountains Institute of Applied Ecology, PO Box 2568 Revelstoke, BC V0E 2S0, Tel: (250)837-9311, fax: (250)83704223, [cmi@junction.net](mailto:cmi@junction.net) Web site: [www.cmiae.org](http://www.cmiae.org)

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