



# SOUTH NAHANNI RIVER

10 YEAR MONITORING REPORT

1998 – 2007

Canadian  
Heritage  
Rivers  
System



Le Réseau  
des rivières  
du patrimoine  
canadien

Prepared for  
Canadian Heritage Rivers Board  
by  
Nahanni National Park Reserve  
Parks Canada  
May, 2008

**South Nahanni River**  
**10 Year Monitoring Report (1998-2007)**  
**Executive Summary**

The South Nahanni River in Nahanni National Park Reserve was designated as a Canadian Heritage River in 1987. This 10 year monitoring report is the second such report prepared by Parks Canada to provide information to the Canadian Heritage Rivers Board on activities, research and studies affecting the South Nahanni River. The most significant change in the management of the South Nahanni River and Nahanni National Park Reserve has been the establishment of the Nahʔa Dehè Consensus Team, and the transition to a cooperative management arrangement between from Parks Canada and Dehcho First Nations.

The South Nahanni River continues to shine as a wonderful example of what makes rivers worthy of being designated as Canadian Heritage Rivers. Despite its isolation, the South Nahanni River attracts hundreds of visitors from across Canada and around the world. A dedicated and passionate constituency of people are very concerned about the well being of the South Nahanni River. Recent surveys and public consultation sessions have shown that Nahanni National Park Reserve, is supported whole-heartedly by many people who will likely never have the opportunity to paddle the South Nahanni River. For many people, simply knowing it is there, and that it is protected is enough.

This second 10 Year Monitoring Report has determined that the vast majority of the natural heritage, recreation and integrity values of the South Nahanni River remain virtually unchanged since designation more than 20 years ago. The conclusion of this report is that the South Nahanni River remains worthy of continued designation as a river of Canadian significance and in fact, should park expansion efforts come to fruition as expected in the near future, the Canadian Heritage Rivers Board may want to consider the nomination and designation of additional reaches of the South Nahanni River.

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## 1.0 INTRODUCTION

The South Nahanni River within Nahanni National Park Reserve has now been designated as a Canadian Heritage River for two decades. Designated for outstanding values related to natural heritage, recreation and integrity, the South Nahanni River continues to be a nationally celebrated icon of northern Canadian wilderness. Through much of the past decade, considerable progress has been made with respect to the long-standing desire to expand the boundaries of Nahanni National Park Reserve. It is entirely likely, that during the decade to come, protective measures will result in the expansion, and establishment, of national parks that will result in the permanent protection of the South Nahanni River from the current upstream boundary all the way to its' headwaters.

The most significant achievement over the past decade in the management of the South Nahanni River within Nahanni National Park Reserve has been the transition from Parks Canada managing this landscape in isolation, to a cooperative park management arrangement between Parks Canada and Dehcho First Nations. Through the unique forum of the Nah?a Dehè Consensus Team, a truly cooperative management regime has been created.

Nahanni National Park Reserve is on the cusp of considerable change, with a considerable expansion of park boundaries likely in the near future. When park expansion occurs, it will be possible to nominate additional sections of the South Nahanni River to the Canadian Heritage Rives Board. The Board will then have an opportunity to not only review the original natural and recreational values for which the South Nahanni River was originally designated as a Canadian Heritage Rivers, but to consider the cultural values of this iconic wilderness river that make it so important to the ongoing tradition of subsistence use by the Dehcho First Nations.

## 2.0 BACKGROUND

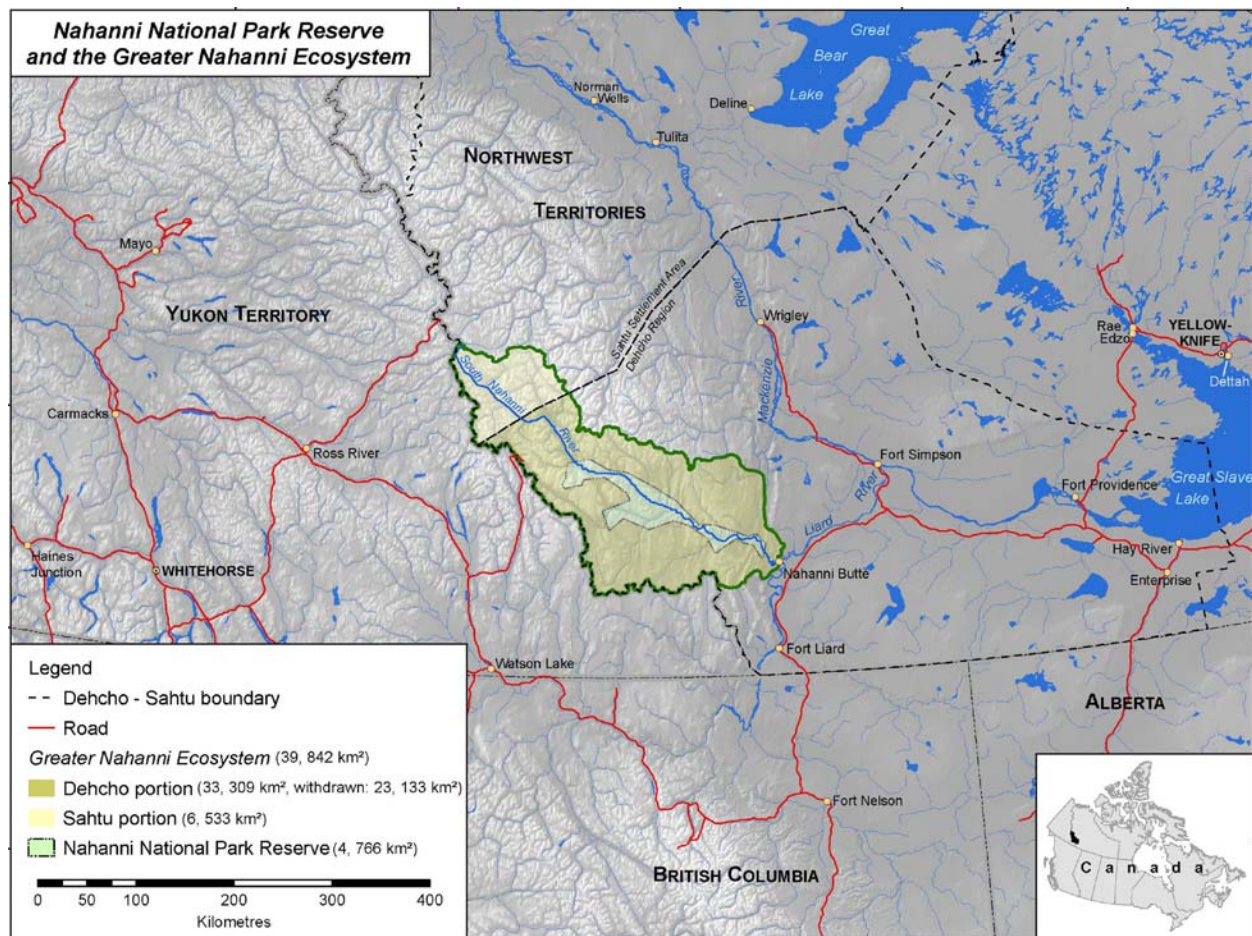
Located in the southwest Northwest Territories, the headwaters of the South Nahanni River are situated along the height of land that forms the border between the Northwest Territories and the Yukon. The South Nahanni River flows for more than 530 km through the Mackenzie Mountains and eventually empties into the Liard River near the small Dene community of Nahanni Butte. At the current time, only the 322 km portion of the South Nahanni River situated within Nahanni National Park Reserve is designated as a Canadian Heritage River. Designated as a Canadian Heritage River in 1987, the South Nahanni River continues to be celebrated as an outstanding icon of northern Canadian wilderness, attracting outdoor adventure enthusiasts from across Canada and around the world.

It is required that every ten years, the Canadian Heritage Rivers Board review the designations of Canadian Heritage Rivers. The intent of this report is to examine and describe the current condition of the natural heritage, recreation and integrity values for which the South Nahanni

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River was nominated and designated as a Canadian Heritage River in 1987. Any changes or management actions influencing the condition of original nomination values will be described for the period 1998-2007.

Despite some concerns from potential industrial development upstream from the boundaries of Nahanni National Park Reserve, the South Nahanni River continues to thrive as a wilderness river. To safeguard against the potential threat posed by development within the watershed of the South Nahanni River, Parks Canada, in cooperation with other agencies of jurisdiction, participates in a rigorous environmental assessment and review process.



**Figure 1** – Geographic Setting of the South Nahanni River (Note: only that section of the South Nahanni River within Nahanni National Park Reserve is designated a Canadian Heritage River.)

### 3.0 CHRONOLOGY OF EVENTS

The following chronology of events speaks to important milestones in the establishment of Nahanni National Park Reserve, the designation of the South Nahanni River as a Canadian Heritage River, and the proposed expansion of Nahanni National Park Reserve.

- 1963 The South Nahanni River identified by the National Parks Branch as a potential park.
- 1970 Prime Minister Pierre Elliot Trudeau travelled the South Nahanni River.
- 1971/1972 Two separate land withdrawals result interim protection of 4,766 km<sup>2</sup> for the purposes of creating Nahanni National Park Reserve.
- 1976 On April 9<sup>th</sup>, Nahanni National Park Reserve was officially designated under the *National Parks Act*. Nahanni's designation as a park reserve recognized that there were outstanding issues related to the settlement of Aboriginal rights, title, or interest in the Dehcho region.
- 1978 The UNESCO World Heritage Committee approved the nomination of Nahanni National Park Reserve to the World Heritage List. Nahanni was among the first group of four natural and eight cultural sites to be nominated.
- 1984 Parks Canada nominated the section of the South Nahanni River within the boundaries of Nahanni National Park Reserve to the Canadian Heritage Rivers Board.**
- 1987 First Park Management Plan for Nahanni National Park Reserve (NNPR) approved by federal government. Plan identified three areas of high value for park expansion purposes.
- 1987 That portion of the South Nahanni River located within Nahanni National Park Reserve was designated a Canadian Heritage River by the Canadian Heritage River System.**
- 1994 Second Park Management Plan (Amendments) for NNPR identified the Greater Nahanni Ecosystem, which includes the entire watershed of the South Nahanni River and the Nahanni North Karst lands, as the area of interest for ecosystem based management.
- 1998 First ten-year monitoring report for the South Nahanni River was prepared for the Canadian Heritage Rivers Board.**

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- 1999 The Dehcho Process, a series of negotiations between Dehcho First Nations and Canada, began. The negotiations are intended to reach agreement on issues of self-governance, resource management and land-use planning.
- 2000 Under the auspices of the Dehcho Process, the Nahʔa Dehé Consensus Team was formed. The NDCT was assigned four primary tasks:
- prepare an Ecological Integrity Statement for Nahanni National Park Reserve;
  - review the Park Management Plan;
  - prepare an Interim Park Management Arrangement, and;
  - prepare a Memorandum of Understanding respecting park expansion.
- 2004 Third Park Management Plan for NNPR, prepared by the Nahʔa Dehé Consensus Team, is approved by Parliament.
- 2004 The Nahanni Expansion Working Group formed by Dehcho First and Parks Canada. The NEWG, consisting of two appointees of Parks Canada, and two appointees of Dehcho First Nations, is charged with two main tasks:
- guide the park expansion feasibility studies, and
  - recommend a new boundary for Nahanni National Park Reserve.
- 2007 Prime Minister Stephen Harper and Environment Minister John Baird visited Ft. Simpson and Virginia Falls to announce an interim land withdrawal for park expansion purposes. The land withdrawal includes the entire Dehcho portion of the Greater Nahanni Ecosystem. This action confirmed the commitment of the Government of Canada to a massive expansion of Nahanni National Park Reserve.
- 2007 At public consultation sessions held in Nahanni Butte, Ft. Simpson, Ft. Liard, Yellowknife and Ottawa, the Nahanni Expansion Working Group presented information about conservation values, the mineral and energy resource assessment work, as well as three different boundary options developed for consideration.
- 2007 The Nahanni Expansion Working Group presented a Final Boundary Recommendation. To Parks Canada and Dehcho First Nations. The Final Boundary Recommendation calls for a final park boundary encompassing 31,630 km<sup>2</sup>.
- 2008 Environment Minister John Baird signed a Memorandum of Understanding with designated Sahtú organisations in Tulita to study the feasibility of creating Nááts'ihch'oh National Park Reserve. The accompanying land withdrawal provides interim protection for 7,600 km<sup>2</sup> of land encompassing the upper portion of the South Nahanni River watershed including the headwaters.
- 2008 Second ten-year monitoring report for the South Nahanni River was prepared for the Canadian Heritage Rivers Board.**

#### 4.0 NATURAL HERITAGE VALUES

As the South Nahanni River passes through Nahanni National Park Reserve, it skirts igneous intrusions, and bisects mountain ranges of sedimentary sandstone, shale and limestone. The entrenchment of the South Nahanni River, which has resulted in sheer canyon walls up to 1,000 m deep, indicated an antecedent river, or rather a river which existed prior to the uplift of the mountains. Thus, the South Nahanni River was able to maintain its meandering course by cutting through the rising mountains rather than being diverted around. Due to rapid runoff encountered in mountainous terrain, the South Nahanni River is subject to relatively rapid flooding. With a vertical drop of 90 m, Virginia Falls, known as Nájłıcho by the local Dene people, is one of North America's great waterfalls, and continues to be one of the most recognizable icons of the Canadian north.

The relative isolation of Nahanni National Park Reserve has helped to protect those values for which the South Nahanni River was originally designated as a Canadian Heritage River in 1987. Isolation, combined with cautious and thoughtful management objectives intended to preserve not only the ecological integrity of the park, but the phenomenal recreation attributes of the river has done much to retain the sense of wilderness for which the South Nahanni River is famous.

There are however numerous threats to the pristine nature of the South Nahanni River. Only 60% of the South Nahanni River, and just 14% of the South Nahanni River watershed are currently protected within the boundaries of Nahanni National Park Reserve. Upstream from present park boundaries, industrial development is a concern. During the past decade, active mining resumed at the property owned by North American Tungsten near the headwaters of the Flat River, which is the principal tributary of the South Nahanni River. In addition, Canadian Zinc Corporation has been engaged in advanced exploration activities at their property on Prairie Creek.

At the North American Tungsten property, known as the Cantung Mine, mining of the tungsten (and copper initially) occurred from 1962 to 1986 first from an open pit and then underground. The mine reopened in 2001, but closed again in 2003. In 2005 the mine reopened and continues to operate today. The Cantung Mine is located on the Flat River which flows into the South Nahanni River. The mine is approximately 200 km upstream of the South Nahanni River. Water quality of the Flat River can be affected by a number of sources at the mine site including: five tailings ponds, tailings in the flood plain of the Flat River and mine site run off.

Since operations resumed at the Cantung Mine, several spills have occurred at the mine site including 23 340 L of fuel and 250 000 L of sewage. Although spill containment and clean up occurred, water quality monitoring has indicated that water quality has occasionally exceeded licence criteria. The results of the environmental effects monitoring and recent research on the impacts of the mine site on the Flat River ecosystem are not yet available. However, based on the water quality results that are available and the distance of the mine from the South Nahanni River, it is unlikely that the mine site has negatively impacted the South Nahanni River.



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The Cantung Mine is expected to cease operations in May 2010. Mine-site closure and reclamation plans and long term monitoring remain issues of concern.

Canadian Zinc Corporation owns the Prairie Creek property which is situated approximately 46 kilometres upstream of the South Nahanni River. In 1982, approval was given for a mine for lead, zinc and a small amount of copper and silver. A virtually complete mine infrastructure was constructed in 1982 and 1983, but the original owners went bankrupt before the mine began commercial operations. Since acquiring the property, Canadian Zinc Corporation had been conducting a program of advanced explorations. In 2005 an extended underground decline was approved and work began with underground blasting and drilling.

The water quality of Prairie Creek and the South Nahanni River could be affected by various chemicals stored at the site. Hazardous chemicals have been stored at the mine site since the 1980's, although Canadian Zinc Corporation recently has repackaged these chemicals in preparation for transportation out of the mine site, so they pose less of a risk now. Water from the mine began to be treated in 2005 as part of the work underground. Water quality monitoring has indicated that since operations underground began in 2005, concentrations of zinc in wastewater have regularly exceeded water licence criteria. The results of recent research on the impacts of the mine site on the Prairie Creek ecosystem are not yet available.

It is anticipated that Canadian Zinc Corporation will submit an application for full mine operation in the near future. Parks Canada is actively participating in regulatory and environmental assessment processes to address these issues, and Parks Canada continues to work with other agencies who are responsible to oversee regulatory and environmental concerns outside the boundaries of Nahanni National Park Reserve.

**Table 1 South Nahanni River Natural Heritage Values**

<b>CHRS Natural Framework (2001) Themes and sub-Themes</b>	<b>South Nahanni River Natural Heritage Elements Description</b>	<b>Significant Actions, Research or Studies</b>	<b>Changes or Threats to Nomination Value(s)</b>
1 HYDROLOGY			
Sub-theme 1.1 Drainage Basin	Mackenzie River Basin	<p>Park Expansion Feasibility studies between 2004-2007, concluded with a Final Boundary Recommendation in December 2007 that, if approved, would result in a massive expansion to Nahanni National Park Reserve.</p> <p>Park expansion in the Dehcho portion of the Greater Nahanni Ecosystem, and park establishment in the Sahtu portion of the GNE may result in the protection of virtually the entire length of the South Nahanni River.</p>	<p>No changes to length of designated section.</p> <p>Pending change to length of river within an expanded national park reserve may lead to nomination of additional sections of the South Nahanni River to the CHR Board.</p>
Sub-theme 1.2 Seasonal Variation	Peak flow occurs during the spring freshet (late June – early July). Periods of lowest flow occur during winter between December and February	<p>Additional automated weather stations have been established in Deadmen Valley and near Yohin Lake. The data collected at these new sites compliments the data collected at Rabbitkettle Lake.</p> <p>In cooperation with the Geological Survey of Canada, Parks Canada has begun to monitor glaciers in the Ragged Range.</p>	Seasonal melting of glaciers in the Ragged Range provides much of the summer flow. Climate change variables may result in periods of increased flow for a number of years.

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<b>CHRS Natural Framework (2001) Themes and sub-Themes</b>	<b>South Nahanni River Natural Heritage Elements Description</b>	<b>Significant Actions, Research or Studies</b>	<b>Changes or Threats to Nomination Value(s)</b>
Sub-theme 1.3 Water Content			
Sub-theme 1.4 River Size	Large River (85-500 m <sup>3</sup> /sec)	None	Global warming may increase short-term peaks but total annual flow may be reduced. If so, river would remain in large river category.
<b>2 PHYSIOGRAPHY</b>			
Sub-theme 2.1 Physiographic Regions	Cordilleran Eastern Ranges	None	None
Sub-theme 2.2 Geological Processes	Sedimentary Layering, Faulting, Folding	Quaternary Geology & Glacial Lake Extents (2005 & 2006)	No development has occurred to affect these values.
Sub-theme 2.3 Hydrogeology	Pervious (Shales)	Groundwater Tracing in North Karst; confirmed flow into South Nahanni (2006)	None
Sub-theme 2.4 Topography	Moderate gradient	None	No changes made to gradient or river flow.
<b>3 RIVER MORPHOLOGY</b>			
Sub-theme 3.1 Valley Types	Vertical-walled valleys (Canyons), Vertical-walled valleys (Braided floors)	None	No changes to condition of canyons or valley types.
Sub-theme 3.2 Channel Patterns	Confined channel	None	No changes to channel type.

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<b>CHRS Natural Framework (2001) Themes and sub-Themes</b>	<b>South Nahanni River Natural Heritage Elements Description</b>	<b>Significant Actions, Research or Studies</b>	<b>Changes or Threats to Nomination Value(s)</b>
Sub-theme 3.3 Channel Profile	Boulder Rapids, Waterfalls	Major redevelopment of visitor use facilities at Virginia Falls occurred just prior to designation. Further redevelopment anticipated in near future (see Recreational Values section).	Natural integrity of area around Virginia Falls challenged by visitor use and by campgrounds and float planes in particular. Other rapids and falls subject to wilderness travel modes only.
Sub-theme 3.4 Fluvial Landforms	1) Deltas, Outwash Plains, Fans 2) Braided Channels, Bars, Islands 3) Springs - Mineral and Hot Springs 4) Caves & Sinkholes	Access to Rabbitkettle Hotsprings is strictly controlled and from 1984 to present there have been annual monitoring efforts for the tufa mounds.  Geologic Controls on Thermal Springs Preliminary Survey of Macroinvertebrates at Thermal Springs)  Access to Grotte Valerie gated since 1980 and permits must be obtained to enter.	No further degradation of caves or karst areas has occurred since designation.  No changes to other morphological values.
<b>4 BIOTIC ENVIRONMENTS</b>			
Sub-theme 4.1 Aquatic Ecosystems	No significant representations	Not Applicable	Not Applicable
Sub-theme 4.2 Terrestrial Ecosystems	Taiga Plains, Taiga Cordillera	Various Annual Monitoring Programs	Wildfire continues to be a significant natural force of change.

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<b>CHRS Natural Framework (2001) Themes and sub-Themes</b>	<b>South Nahanni River Natural Heritage Elements Description</b>	<b>Significant Actions, Research or Studies</b>	<b>Changes or Threats to Nomination Value(s)</b>
5 VEGETATION			
Sub-theme 5.1 Significant Plant Communities	Relict species, or concentrations of unusual species	Some research on plant communities at hot spring sites.	None
Sub-theme 5.2 Rare Plant Species		Preliminary survey of Nahanni Aster	
6 FAUNA			
Sub-theme 6.1 Significant Animal Populations	Mammals Birds	Various research projects and annual monitoring programs (see Appendix 1)	Research and monitoring has led to greater understanding of movement and distribution patterns of important species.
Sub-theme 6.2 Rare Animal Species	Vulnerable Species Endangered Species	Various research projects and annual monitoring programs (see Appendix 1)	No loss of species recorded.  Park species newly listed or updated by COSEWIC since 1998 (Endangered EN, Threatened TH, Special Concern SC): Woodland Caribou (N Mtn Pop) SC Common Nighthawk TH Olive-sided Flycatcher TH Peregrine Falcon SC Yellow Rail SC Short-eared Owl SC Rusty Blackbird SC Western Toad SC

## **5.0 RECREATION VALUES**

Each year, people from across Canada and around the world journey to Nahanni National Park Reserve to participate in a trip of a lifetime. Travelling by canoe or raft, privately or with the assistance of a commercial guide, hundreds of adventure seekers experience the thrill of the South Nahanni River.

The most dominant feature of the park is the South Nahanni River. Recreational use of the park follows this narrow, linear corridor and is primarily water-based. Associated with this use of the river are numerous off-river camping and hiking opportunities. In this light, the portion of the park that is used by visitors is not an extensive area and it is obvious that there is a limited capability to sustain recreational activities in the park's wilderness management objectives are to be met. In recent years, day-use, and overnight river use has fluctuated to some degree, and when coupled with a short operational season there are times when visitors have reported a perception of crowding at Virginia Falls.

Non-motorized watercraft is accepted as the only means of travel for visitors on the South Nahanni River within the park reserve. Access is provided by chartered aircraft at Rabbitkettle Lake and at Virginia Falls. Some visitors begin their trip upstream of the park boundary and enter the park via the South Nahanni River near Rabbitkettle Lake. Wherever possible use of motorized watercraft needed for park operations is scheduled outside of the primary park visitation season. Traditional subsistence harvesting activities by Aboriginal people are not limited by the restriction on non-motorized travel in the park, although most subsistence harvest activity takes place outside the principle period of visitation.

In recent years, considerable emphasis has been placed on improving the level of service with respect to interpretive programming for visitors. In 2000, a new program designed to present Aboriginal Heritage to park visitors was initiated. This program is delivered by local Dene youth who are hired as interpreters and communicators. The program is delivered at Virginia Falls, where 100% of visitors to the park, be they day-use visitors or over-night river trippers, spend time. This program has been a resounding success. To further understand visitor needs and to gain information that would allow the park to improve its service offer, a series of surveys and studies was initiated in 2006. The results of these surveys are summarized below.

### **1. Patterns of Visitor Use Study 2006**

The objectives of the study were to:

- Develop a profile of park visitors and identify patterns of use on the landscape;
- Understand visitor motivations and satisfaction with park services;
- Compare 2006 and 1986 findings, where appropriate; and
- Collect data used to refine parallel project data including economic impact assessment and predict levels of visitor use as well as behaviours for key nodes within the park through human use simulation modeling.

Results indicate that overall satisfaction levels are very high with 97% of overnight visitors and 99% of day visitors indicating a satisfied response. Highest ratings of specific trip characteristics include 97% satisfaction with each of recreational experience and park staff courteousness for overnight river users; and 100% satisfaction with condition of park facilities for day users.

Data was obtained by inviting overnight visitors from 2004, 2005, 2006 to participate in an on-line survey. Day visitors from 2006 were invited to complete either an intercept or mailed survey. An innovative interactive mapping tool was developed for the on-line survey where visitors plotted their camping and hiking locations as well as any bear sightings or river incidents. The intention is to build on this new tool and ultimately integrate data obtained with other GIS data layers for the purposes of modelling patterns of visitor use and enhancing park management.

## **2. Aboriginal Heritage Presentation Program Assessment Phase One**

The objectives of the study were to:

- Conduct an on-site as well as interview based assessment of the Aboriginal Heritage Presentation Program including interviews with staff, volunteers, partners and businesses as well as visitors;
- Conduct a literature review and case studies of a selection of Aboriginal Heritage Presentation Programs with relevance to Nahanni National Park Reserve;
- Develop and overview of markets and potential products for Aboriginal Heritage Presentation;
- Provide strategic recommendations for development of an enhanced Aboriginal Heritage Presentation Program.

Quantitative and qualitative data were analyzed showing high overall satisfaction with the Aboriginal Heritage Presentation Program by both overnight visitors and day visitors. Results indicate that in general, messages are being delivered effectively and content is given a high rating. Strengths of the program include: 1) messages being delivered effectively increasing awareness and knowledge; 2) visitors very satisfied with programs and would recommend them to others; and 3) staff and partners very committed to the program and share a common vision that it be enhanced.

The product market match and associated strategic recommendations include: 1) reviewing and re-establishing program goals and objectives; 2) enhancing collaborative program planning between Nahanni National Park Reserve and Dehcho First Nations; 3) enhancing program delivery techniques and skills; 4) enhancing product development; 5) improving training as well as capacity building; and 6) improving marketing.

### **3. Patterns of Visitor Use Study 2007 and Aboriginal Heritage Presentation Program Assessment Phase Two**

The objectives of the study were to:

- Build on the 2006 survey continuing to develop a profile of park visitors and identify patterns of use on the landscape;
- Understand visitor motivations and satisfaction with the Aboriginal Heritage Presentation Program;
- Compare 2007, 2006 and 1986 findings, where appropriate; and
- Collect data used to refine parallel project data including economic impact assessment and predict levels of visitor use as well as behaviours for key nodes within the park through human use simulation modeling.

Consistent with past results, 87% of people surveyed were first-time visitors. Overnight visitors account for 86% of visitors and 61% of overnight visitors traveled through Nahanni National Park Reserve with a licensed commercial river outfitting / guiding company.

All day visitors (100%) and 50% of overnight visitors surveyed participated in a heritage presentation program. Overall 84% of visitors indicated that heritage presentation programs met their expectations. The impact of programs was also measured relative to increasing visitor knowledge and respect for natural features, cultural features and significance of the park to local Aboriginal people.

The on-line interactive map from 2006 was replicated and data was obtained regarding locations where people camped, hiked, saw bears or had a paddling incident. As in 2006, feedback was also obtained regarding the interactive map technology. The feedback will be used to enhance and modify the tool for future visitor surveys.

### **4. Non-Personal Media Assessment**

The objectives of the study were to:

- Review, describe and provide highlights of natural / cultural heritage industry standards, references and guidelines for non-personal media;
- Identify, describe and define opportunities for local, regional, territorial, national as well as international contact and distribution points for non-personal media;
- Define strengths, weaknesses, effectiveness and conduct gap analysis of non-personal media; and
- Identify options and recommendations for enhanced or new non-personal media product development.



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A high percentage of visitors are satisfied with non-personal media exhibits (89%) and publications (87%). The usefulness and quality of existing print and exhibit products is considered to be high while a gaps are identified in reaching potential visitors in Fort Simpson as well as local community residents. Potential exists to enhance this aspect of visitor experience.

The highest priority identified is to develop an interpretive plan to define and prioritize themes, messages, audiences and media. Assessment and re-configuration of the website is a second priority followed by an assessment of staffing and resources to fine-tune the program delivery in order to meet needs for repairs, updates and re-prints. The potential park expansion will have significant implications and needs to be planned for in the non-personal media program.



Trina Marcellais, Aboriginal Student Interpreter, demonstrates the use of a moose hide scraper during an interpretive program at Náílįcho (Virginia Falls).



Members of a commercially guided canoe trip enjoy a floating rest along the South Nahanni River.

**Table 2 South Nahanni River Recreation Values**

<b>Recreational Value</b>	<b>Changes since 1988 and Threats to Condition</b>	<b>Actions and Related Research</b>
<p>Primitive Camping at Rabbitkettle Lake, Virginia Falls, and Kraus Hotsprings</p>	<p>Capacity of park staff could not keep pace with the rate of deterioration of campground, boardwalk and other assets at Virginia Falls.</p> <p>Certain popular camping locations along the South Nahanni River showed signs of over-use.</p> <p>Certain no-trace camping practices have been adopted.</p>	<p>A major re-capitalization of the boardwalk, aircraft docking area and campground occurred between 2002 and 2005. Improvements included total replacement of the boardwalk portage and trails, re-design of the campground, including elevated tent platforms, and construction of food caches. Human waste management issues continue to be a challenge and are a source of negative comments from visitors.</p> <p>The campsite monitoring program was revised in 2000. This monitoring program now assesses the impacts to known camping locations along the South Nahanni River on an annual basis. As a result of this monitoring program, some campsites have been temporarily closed to public use in order to allow the vegetation to recover from trampling.</p> <p>The campsite monitoring program demonstrated that fire-pits, and fire scars were a source of impact. In response to this, the park implemented a regulation requiring the use of fireboxes to contain fires. Open fires are no longer allowed along the South Nahanni River. One small business in Fort Simpson has collapsible fireboxes available for sale or rent, although many visitors chose to bring their own.</p>
<p>Fly-in day use visits to Virginia Falls</p>	<p>Day-use visitors to Virginia Falls account for approximately 30% of the annual visitation to Nahanni National Park Reserve.</p> <p>Smoke from forest fires has the potential to prevent aircraft from travelling to Virginia Falls.</p>	<p>The re-capitalization of the facilities at Virginia Falls between 2002 and 2005 improved conditions for both day-use visitors and overnight visitors.</p> <p>Wildfires in 1998, 2001, 2004, and 2006 did produce considerable smoke that affected visibility, however, it is not known if any flights to Virginia Falls were cancelled, or postponed due to the smoke conditions.</p>

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<b>Recreational Value</b>	<b>Changes since 1988 and Threats to Condition</b>	<b>Actions and Related Research</b>
Angling	Research has shown that Lake Trout and Bull Trout, but not Dolly Varden char, occur in South Nahanni River and tributaries.	<p>The popularity of sport fishing among river travelers has been dropping in for many years, as evidenced by the declining sale of fishing permits. Creel censuses have not occurred on a regular basis.</p> <p>As a result of concern from Aboriginal cooperative management partners, catch &amp; release fishing is discouraged in the park reserve.</p> <p>Research undertaken with Fisheries &amp; Oceans has shown Bull Trout distribution to be limited to waters below Virginia Falls. The species is of concern due to its sensitivity to industrial developments and angling pressure. A zero catch limit has been implemented for Bull Trout.</p>
Valley hiking at Sunblood Mtn., Marengo Falls, Prairie Creek and Dry Canyon Ck., and Rabbitkettle Hotsprings.	Level of use results in the potential for habitat destruction, erosion, and landscape scarring through informal trail development.	<p>There are no formal trails in Nahanni National Park Reserve other than designated portage trails and the interpretive trail between Rabbitkettle Lake and the Tufa Mounds at Rabbitkettle Hotsprings.</p> <p>Visitors interested in hiking are provided with information regarding route descriptions for the more popular hiking areas. Hiking routes commonly follow creek beds.</p> <p>The hiking routes at Sunblood Mountain and The Gate (Pulpit Rock) are showing signs of significant use, and some visitors have suggested that formal, maintained trails be developed in some locations.</p>

**Visitor Statistics**

A variety of visitor statistics have been collected every year since 1984. Over this time, the average number of overnight visitors is 616 of which an average of 367 are guided. Overnight visitor group size average is 6 people with an average trip length of 11.5 days. The average number of day visitors is 368 and the average number of total park visitors is 983 people. Since 1996 the two locations where the greatest number of visitors begin their trip average 229 at Virginia Falls and 179 at Rabbitkettle Lake. A number of other statistics including aircraft landings and participation in heritage presentation programs are also collected at these two primary visitor nodes.

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**Table 3 – Visitor Use Statistics – 1998-2007**

Year	Total O/N Users	Guided Users	Guided Trips	Private Users	Private Trips	Total # Trips	Avg. Grp. Size	Avg. Trip Length	Total Day Use	Total Park Visits
1998	606	326	34	280	59	93	6.5		185	791
1999	561	354	34	207	56	100	6.2	10.6	300	861
2000	579	398	38	181	49	82	6.6	11.7	350	929
2001	641	439	45	202	44	89	7.2	12.3	295	936
2002	486	272	29	214	48	77	6.3	11.4	491	977
2003	623	383	43	240	43	86	7.2	10.5	395	1018
2004	565	270	38	295	67	105	5.3	11	322	887
2005	705	400	39	305	57	96	7.3	13	306	1020
2006	581	365	39	216	44	83	7	11.18	215	796
2007	586	383	49	203	44	93	6.3	14.15	149	735

Average Group Size = Total O/N Users / Total # Trips  
Average Trip Length = Total # Days All Trips / Total # Trips

## 6.0 INTEGRITY VALUES

There continues to be a high degree of overall natural and recreational integrity for the South Nahanni River within Nahanni National Park Reserve. Upstream development does have the potential to impact the integrity of the South Nahanni River watershed, but these concerns have been mitigated through the environmental assessment and review process. A vocal campaign by the public has called for the permanent protection of the entire South Nahanni River watershed. During recent public consultations, these public concerns played a role in helping to determine a Final Boundary Recommendation for the eventual expansion of Nahanni National Park Reserve.

**Table 4 South Nahanni River Integrity Values**

Integrity Value	Changes since 1987 and Threats to Condition	Actions and Related Research
<b>Natural Integrity Values</b>		
Free-flowing waters No upstream impoundments No downstream impoundments	Except for tailings ponds at mines, there are no impoundments, either existing or proposed, within the South Nahanni River watershed.	None
Minimal human impact on key ecosystem components	Human impact on key ecosystems components includes: <ul style="list-style-type: none"> <li>- subsistence trapping and hunting</li> <li>- human induced forest fires</li> <li>- visitor use at key sites e.g. Virginia Falls</li> </ul>	Subsistence trapping and hunting is allowed according to National Park policy at a subsistence level. Although data does not exist, it is unlikely that the level of subsistence harvest is having an impact on wildlife populations. No data exist on the number of forest fires believed to have been caused by humans, although the frequency is believed to be very low.
Water quality suitable for continuation of original aquatic ecosystems	Nutrient levels have remained steady and there have been no major pollution occurrences, although the potential for this exists as a result of two mines with the immediate watershed.	<i>Protecting the Aquatic Quality of Nahanni National Park Reserve, 1998.</i> Summary of field activities and laboratory analysis of water, sediment and fish tissue monitoring of the South Nahanni and Flat Rivers in Nahanni National Park Reserve.

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<b>Integrity Value</b>	<b>Changes since 1987 and Threats to Condition</b>	<b>Actions and Related Research</b>
<b>Recreational Integrity Values</b>		
Recreational use has insignificant impact on river values.	Insignificant or minimal.	Requirement for visitors to obtain a reservation, and limits on length of stay at Virginia Falls campground serves as a means of spreading human use out and minimizing impacts.
Shoreline uses have minimal impact on recreational values	Minimal, localized impacts to shoreline campsites.	Annual campsite monitoring program.
Water quality suitable for non-contact recreation	Water Quality monitoring has not detected values of concern.	Although no cases of giardia have been confirmed, and testing has not detected the cysts that cause giardiasis infection, park visitors are advised to boil, filter, or otherwise treat water before it is consumed.
<b>General Integrity Values</b>		
<b>Integrity of ecosystems</b>		
National park reserve boundaries and zones	Significant changes have occurred since 1999, when the Dehcho Process was initiated.	The Nahanni Expansion Working Group, consisting of appointees from Dehcho First nations and Parks Canada was formed in 2004. Comprehensive park expansion feasibility studies took place between 2004 and 2007. The culmination of these studies was a Final Boundary Recommendation to Dehcho First Nations and Parks Canada in December 2007.

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<b>Integrity Value</b>	<b>Changes since 1987 and Threats to Condition</b>	<b>Actions and Related Research</b>
Regional integration	Although park reserve boundaries have not yet changed, much work towards this goal has been achieved during the past decade.	Nahanni National Park Reserve is managed cooperatively by Parks Canada and the Dehcho First Nations. The area of concern with respect to the ecological integrity of Nahanni national Park Reserve is the Greater Nahanni Ecosystem.
Aboriginal land claim negotiations and settlements	<p>The Dehcho Process began in 1999. This series of negotiations between Dehcho First Nations and Canada is intended to settle issues related to self-governance, resource management and land-use planning.</p> <p>The Dehcho Process will determine park expansion and will result in Nahanni achieving full national park status.</p>	Through the Dehcho Process, the Nahʔą Dehé Consensus Team was created in 2000 and consists of 4 members appointed by Dehcho First Nations and 3 members appointed by Parks Canada. Guided by the Interim Park Management Arrangement, the Nahʔą Dehé Consensus Team oversees the cooperative management of Nahanni National Park Reserve and provides advice and recommendations to the Park Superintendent.
UNESCO World Heritage Site designation for Nahanni National Park Reserve	Threats to the regional ecosystem from potential mining activities prompted review.	<p>Formal letters of correspondence between World Heritage Committee and Parks Canada regarding status and threats to Nahanni.</p> <p>Designation as UNESCO World Heritage Site still appropriate.</p> <p>Periodic Report to WHC submitted in 2005.</p>

## 7.0 MANAGEMENT OBJECTIVES

In 2004, a new Park Management Plan for Nahanni National Park Reserve was approved by Parliament. An ecological vision statement serves as the guiding force for the Park Management Plan, and an ecosystem-based approach to management is fundamental to meeting the challenge of protecting the ecological integrity of Nahanni National Park Reserve

From the highest mountain peaks, to the lowest valleys, all water within Nahanni National Park Reserve eventually flows into the South Nahanni River. By protecting the ecological integrity of the park as a whole, the South Nahanni River is thus protected, and it will continue to serve as a place of mystery, a place of adventure, and a place where renewal of spirit is possible.

### **An Ecological Vision for Nahʔa Dehé**

*Nahʔa Dehé will protect a wilderness watershed in the Mackenzie Mountains where natural processes such as fires and floods continue to be the dominant forces shaping the park's ecosystems. Special features of the park, including waterfalls, hot springs, glaciers, plateaux, canyons, karst landscapes and cultural/spiritual sites will be preserved. Naturally-occurring plant communities will thrive and native animal species, including woodland caribou and grizzly bears, will be sustained at viable population levels.*

*Dene are inseparable from the land. Traditional subsistence harvest will continue to be an integral and sustainable part of the ecosystem and will occur in accordance with Dene law and principles. Nahʔa Dehé will continue to be revered as a place of mystery, spirituality and healing.*

*Nahʔa Dehé will be a model of cooperative management with First Nations of the Dehcho where ecological and cultural integrity is protected, visitor access and enjoyment is encouraged within the limits of ecological integrity and wilderness experience, and messages of natural and cultural heritage are communicated with excellence. Nahʔa Dehé will also serve as a national long-term ecological research and monitoring site, and will promote excellence in the conduct of science and cooperative resource protection.*

The following table (Table 5) outlines several strategic goals which were identified in the 2004 Park Management Plan and these relate directly to the South Nahanni River, and actions intended to manage against activities or events that would impact the South Nahanni River.



**Table 5 Park Management Plan – Strategic Goals, Objectives and Key Actions**

Strategic Goal (S) Objective (O) Key Action (KA)	Description
5.1.1 (S)	Protect the ecological integrity of Nahʔa Dehé
5.2.1 (S)	Natural ecological processes such as fire and flooding remain the primary forces shaping the ecosystem.
5.2.1.1 (O)	To ensure the South Nahanni and Flat Rivers remain wild, free-flowing watercourses.
5.2.2.1 (O)	To maintain high water quality.
5.3.1 (S)	Nahʔa Dehé retains its current high levels of native biodiversity.
5.3.1.2 (KA)	Monitor sport-fishing activities within the park reserve to ensure that the natural dynamics of fish populations is not jeopardized.
7.2 (S)	The natural, cultural and recreational values that led to the designation of the South Nahanni River as a National Park Reserve, as a UNESCO World Heritage Site, and as a Canadian Heritage River are safeguarded.

## **8.0 PROPOSED EXPANSION OF NAHANNI NATIONAL PARK RESERVE**

There have been calls to expand the boundaries of Nahanni National Park Reserve since the park was established. Numerous studies have been undertaken to identify potential new boundaries for the park. The initiative to expand park boundaries gained momentum in 1999 when the Dehcho Process was initiated. The Dehcho Process is a series of negotiations between Dehcho First Nations and Canada. Dehcho First Nations do not view this as a land claim process *per se*. The Dehcho Process can be characterised as a series of negotiation intended to resolve outstanding issues respecting self-governance, resource management, and land-use planning.

Through the Dehcho Process, the Nahʔa Dehé Consensus Team was formed in 2000. The Nahʔa Dehé Consensus Team consists of 7 members: two of who are appointed by Nahanni Butte Dene Band, two by Dehcho First Nations, and the remaining three by Parks Canada. The Superintendent of Nahanni National Park Reserve, and the Grand Chief of Dehcho First Nations also sit as *ex-officio* members. Initially, the Nahʔa Dehé Consensus Team was given four principle goals:

- a) prepare an Ecological Integrity Statement for Nahanni NPR,
- b) prepare a new Park Management Plan for Nahanni NPR,
- c) prepare an Interim Park Management Arrangement for Nahanni NPR, and
- d) prepare a Memorandum of Understanding Respecting Park Expansion

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In a cooperative manner, and through a forum of true consensus decision-making, the Nahʔa Dehè Consensus Team completed these tasks in 2004. Since that time, the focus of the Nahʔa Dehè Consensus Team has shifted to some degree, and they now guide the cooperative management of Nahanni National Park Reserve through the mechanisms outlined in the Interim Park Management Arrangement. The Nahʔa Dehè Consensus Team will continue to oversee the cooperative management of Nahanni National Park Reserve until such time as the Dehcho Process concludes with a final agreement and a final cooperative management forum is confirmed. Significant achievements have been made in recent years, and the Nahʔa Dehè Consensus Team constitutes a unique and very productive arrangement between Parks Canada and First Nations.



Nahʔa Dehè Consensus Team, 2006

In 2004, following the approval of the Memorandum of Understanding Respecting Park Expansion, the Nahanni Expansion Working Group was created. The Nahanni Expansion Working Group consisted of 4 members, two of whom were appointed by Dehcho First Nations, and the remaining two by Parks Canada. The principle task given to the Nahanni Expansion Working Group was to complete work on a feasibility study toward the addition of identified lands to Nahanni National Park Reserve, and to recommend a new boundary to allow for the expansion of Nahanni National Park Reserve. In addition, the Nahanni Expansion Working group also contributed towards the development of the Dehcho Land Use Plan.

The Nahanni Expansion Working Group undertook two public consultation processes during the park expansion feasibility studies. The public consultation process provided opportunities for the public, stakeholders, community governments and a wide variety of other people and organizations to be involved in the review of information and boundary options. In the fall of 2007, national consultations presented three distinct park boundary options. Following feedback and comment from a wide variety of individuals, the Nahanni Expansion Working group made a Final Boundary Recommendation to Dehcho First Nations and Parks Canada. Negotiations are now underway, both within government, and between government and First Nations to agree on a final boundary for Nahanni National Park Reserve.

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The work of the Nahanni Expansion Working group only applied to the Dehcho portion of the Greater Nahanni Ecosystem. The Greater Nahanni Ecosystem includes the watershed of the South Nahanni River, and the Nahanni North Karstlands. The Nahanni North Karstlands are included in the Greater Nahanni Ecosystem due to the unique situation of underground water drainage. Even though the Nahanni North Karstlands are outside the surface watershed of the South Nahanni River, there is a unique system of underground drainage patterns that result in some of the water from this region flowing underground into the South Nahanni River watershed.

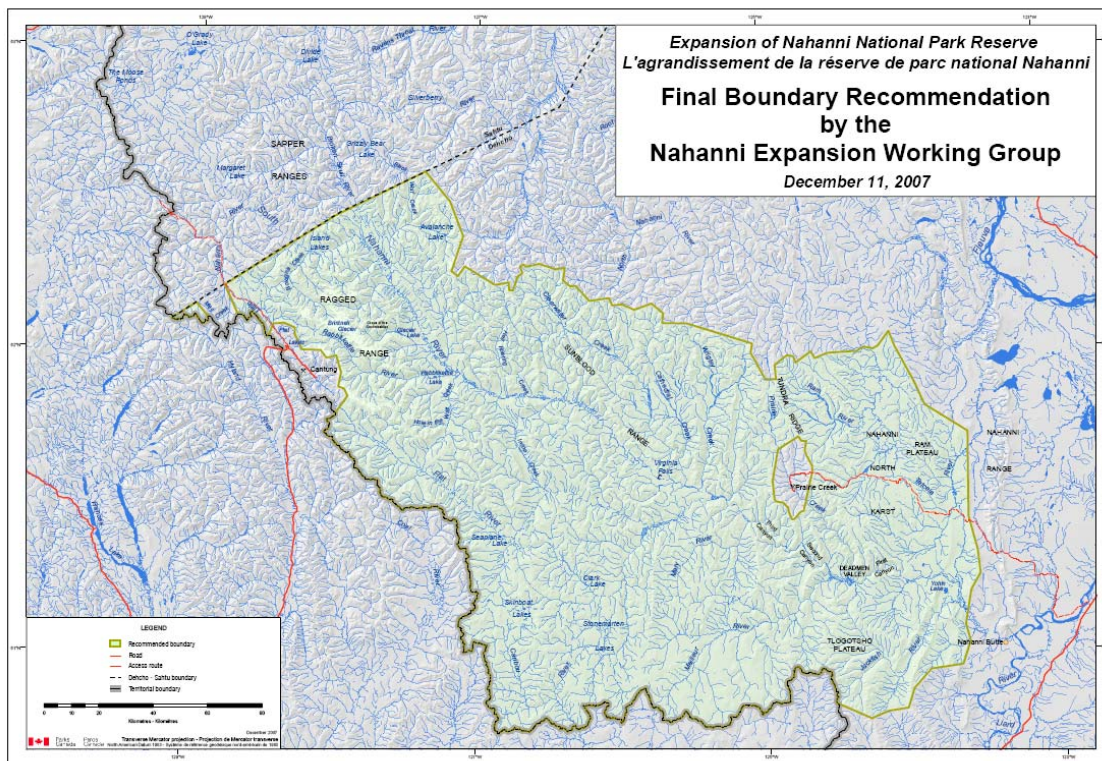


Figure 2 Final Boundary Recommendation by the Nahanni Expansion Working Group, 2007

The Greater Nahanni Ecosystem encompasses a geographic area of more than 39,000 square kilometres. The political division between the Sahtú Settlement Area and the Dehcho region cuts across the upper portion of the Greater Nahanni Ecosystem. As a result, approximately 16% of the Greater Nahanni Ecosystem lies outside the Dehcho region, and is situated in the Sahtú Settlement Area. A separate and distinct process is required to protect this area, and to that end, in April 2008, Environment Minister John Baird signed a Memorandum of Understanding with designated Sahtú organisations representing the Dene and Métis of the Tulita District to study the feasibility of creating Nááts'ihch'oh National Park Reserve. The accompanying land withdrawal will provide interim protection for 7,600 km<sup>2</sup> of land encompassing the upper portion of the South Nahanni River watershed.

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Parks Canada will work with the appropriate organisations in the Tulita District of the Sahtú Settlement Area to negotiate an Impact and Benefits Agreement that could lead to the establishment of a new national park reserve that is connected to an expanded Nahanni National Park Reserve in the Dehcho region. The end result is that it is possible that the entire length of the South Nahanni River upstream from the present day boundary near Nahanni Butte could be protected within 2 national park reserves.

## **9.0 SUMMARY**

The South Nahanni River remains an iconic symbol of northern Canadian wilderness. Since being designated as a Canadian Heritage River in 1988, more than 20,000 people have visited Nahanni National Park Reserve, and 63% of those people have undertaken a wilderness canoe or raft trip down the South Nahanni River. For many, the act of travelling the South Nahanni River results in a profound experience, and a very strong and vocal group of supporters now exists across Canada and around the world.

Over the past decade, Parks Canada, and staff from Nahanni National Park Reserve have forged a strong relationship with Dehcho First Nations. Under the watchful eye of the Nahʔa Dehè Consensus Team, an innovative form of cooperative management has been instituted, and this has resulted in a more holistic approach to the management of the South Nahanni River and Nahanni National Park Reserve.

The potential for a massive expansion of Nahanni National Park Reserve is a reason to celebrate, and in the near future, additional sections of the South Nahanni River may be nominated to the Canadian Heritage Rivers Board for designation to the Canadian Heritage Rivers System.

## **Appendix 1 Annual Research & Monitoring Activities (1998-2007)**

### **1998**

- Spring Bird Migration Monitoring – Rabbitkettle Lake
- Aspen Phenology Monitoring – Rabbitkettle Lake
- Satellite Monitoring of Northern Ecosystems
- River Discharge (Water Flow) Monitoring
- Woodland Caribou – Distribution and Relocation Monitoring
- Water Quality Monitoring
- Ice Phenology – Rabbitkettle Lake
- Climate Monitoring – Rabbitkettle Lake
- Human Use Monitoring
- Rabbitkettle Hotsprings Tufa Mound Monitoring

### **1999**

- Spring Bird Migration Monitoring – Rabbitkettle Lake
- Aspen Phenology Monitoring – Rabbitkettle Lake
- Satellite Monitoring of Northern Ecosystems
- River Discharge (Water Flow) Monitoring
- Woodland Caribou – Distribution and Relocation Monitoring
- Water Quality Monitoring
- Ice Phenology – Rabbitkettle Lake
- Climate Monitoring – Rabbitkettle Lake
- Human Use Monitoring
- Rabbitkettle Hotsprings Tufa Mound Monitoring

### **2000**

- South Nahanni Woodland Caribou Hear Seasonal Range Use and Demography
- Cultural Resources Survey - Preliminary Reconnaissance of the South Nahanni River
- Upland Sandpiper Survey – Prairie Creek Alluvial Fan
- Vascular Plant & Bryophyte Assessment at Hole-in-the-Wall Lake
- Vascular Plant and Bryophyte Assessment at Hotsprings Areas
- Forest Bird Survey – Deadmen Valley
- Trumpeter Swan Survey
- Spring Bird Migration Monitoring – Rabbitkettle Lake
- Aspen Phenology Monitoring – Rabbitkettle Lake
- Satellite Monitoring of Northern Ecosystems
- River Discharge (Water Flow) Monitoring
- Water Quality Monitoring
- Ice Phenology – Rabbitkettle Lake

- Climate Monitoring – Rabbitkettle Lake
- Human Use Monitoring
- Campsite Monitoring
- Rabbitkettle Hotsprings Tufa Mound Monitoring

## 2001

- Automated Climate Stations established in Deadmen Valley and near Yohin Lake
- Bull Trout – Distribution, Life History and Habitat Requirements
- Cultural Resources Survey – South Nahanni River below Virginia Falls
- Dall’s Sheep Composition Count
- Upland Sandpiper Survey – Prairie Creek Alluvial Fan
- Forest Bird Survey – Deadmen Valley
- Palaeolimnological Assessment of Big Sinkhole Pond - Rabbitkettle Lake
- Spring Bird Migration Monitoring – Rabbitkettle Lake
- Aspen Phenology Monitoring – Rabbitkettle Lake
- Reconstruction of Past Climate and Stream Flow using Tree Ring Analysis
- Satellite Monitoring of Northern Ecosystems
- River Discharge (Water Flow) Monitoring
- Water Quality Monitoring
- Woodland Caribou Survey
- Ice Phenology – Rabbitkettle Lake
- Climate Monitoring – Rabbitkettle Lake, Deadmen Valley, Yohin Lake
- Human Use Monitoring
- Campsite Monitoring
- Rabbitkettle Hotsprings Tufa Mound Monitoring

## 2002

- Grizzly Bear Distribution and Relative Abundance – Year 1
- Cultural Resources Survey – South Nahanni River above Virginia Falls
- Dall’s Sheep Composition Count
- Fire History of Nahanni National Park Reserve and Vicinity
- Upland Sandpiper Survey – Prairie Creek Alluvial Fan
- Spring Bird Migration Monitoring – Rabbitkettle Lake
- Aspen Phenology Monitoring – Rabbitkettle Lake
- Satellite Monitoring of Northern Ecosystems
- River Discharge (Water Flow) Monitoring
- Water Quality Monitoring
- Ice Phenology – Rabbitkettle Lake
- Climate Monitoring – Rabbitkettle Lake, Deadmen Valley, Yohin Lake

- Human Use Monitoring
- Campsite Monitoring
- Rabbitkettle Hotsprings Tufa Mound Monitoring

## 2003

- Grizzly Bear Distribution and Relative Abundance – Year 2
- Preliminary Survey of Macro-Invertebrates at Thermal Springs
- Geologic Controls on Thermal Springs
- Moose Survey
- Dall's Sheep Composition Count
- Nahanni Aster – Status and Site Assessment
- Upland Sandpiper Survey – Prairie Creek Alluvial Fan
- Spring Bird Migration Monitoring – Rabbitkettle Lake
- Aspen Phenology Monitoring – Rabbitkettle Lake
- Satellite Monitoring of Northern Ecosystems
- River Discharge (Water Flow) Monitoring
- Water Quality Monitoring
- Ice Phenology – Rabbitkettle Lake
- Climate Monitoring – Rabbitkettle Lake, Deadmen Valley, Yohin Lake
- Human Use Monitoring
- Campsite Monitoring
- Rabbitkettle Hotsprings Tufa Mound Monitoring

## 2004

- Grizzly Bear Distribution and Relative Abundance – Year 3
- Woodland Caribou Seasonal Ranges and Migration Routes – Year 1
- Bull Trout Distribution
- Moose Survey
- Spring Bird Migration Monitoring – Rabbitkettle Lake
- Aspen Phenology Monitoring – Rabbitkettle Lake
- Satellite Monitoring of Northern Ecosystems
- Forest Health Survey
- Soapberry Monitoring – Rabbitkettle Lake
- River Discharge (Water Flow) Monitoring
- Water Quality Monitoring
- Ice Phenology – Rabbitkettle Lake
- Climate Monitoring – Rabbitkettle Lake, Deadmen Valley, Yohin Lake
- Human Use Monitoring
- Campsite Monitoring
- Rabbitkettle Hotsprings Tufa Mound Monitoring

## 2005

- Grizzly Bear Distribution and Relative Abundance – Year 4
- Woodland Caribou Seasonal Ranges and Migration Routes – Year 2
- Bull Trout Distribution
- Western Toad Survey
- Butterfly Inventory
- Glacier Retreat Survey
- Air Quality and Pesticide Transport Monitoring – Year 1
- Quaternary Geology & Glacial Lake Extent
- Moose Survey
- Raptor Survey
- Trumpeter Swan Survey
- Dall's Sheep Composition Count
- Upland Sandpiper Survey – Prairie Creek Alluvial Fan
- Forest Bird Survey – Deadmen Valley
- Spring Bird Migration Monitoring – Rabbitkettle Lake
- Aspen Phenology Monitoring – Rabbitkettle Lake
- Satellite Monitoring of Northern Ecosystems
- Forest Health Survey
- Soapberry Monitoring – Rabbitkettle Lake
- River Discharge (Water Flow) Monitoring
- Water Quality Monitoring
- Ice Phenology – Rabbitkettle Lake
- Freshwater Ecosystem Monitoring
- Climate Monitoring – Rabbitkettle Lake, Deadmen Valley, Yohin Lake
- Human Use Monitoring
- Campsite Monitoring
- Rabbitkettle Hotsprings Tufa Mound Monitoring

## 2006

- Woodland Caribou Seasonal Ranges and Migration Routes – Year 3
- Air Quality and Pesticide Transport Monitoring – Year 2
- Moose Survey
- Bat Inventory
- Quaternary Geology & Glacial Lake Extent
- Landslide Hazard Assessment and Soils Research
- Assessment of Nahanni North Karst & Grotte Valerie
- Bull Trout Distribution
- Dall's Sheep Composition Count
- Upland Sandpiper Survey – Prairie Creek Alluvial fan



- Spring Bird Migration Monitoring – Rabbitkettle Lake
- Aspen Phenology Monitoring – Rabbitkettle Lake
- Satellite Monitoring of Northern Ecosystems
- Soapberry Monitoring – Rabbitkettle Lake
- River Discharge (Water Flow) Monitoring
- Water Quality Monitoring
- Ice Phenology – Rabbitkettle Lake
- Freshwater Ecosystem Monitoring
- Climate Monitoring – Rabbitkettle Lake, Deadmen Valley, Yohin Lake
- Human Use Monitoring
- Campsite Monitoring
- Rabbitkettle Hotsprings Tufa Mound Monitoring

## **2007**

- Woodland Caribou Seasonal Ranges and Migration Routes – Year 4
- Air Quality and Pesticide Transport Monitoring – Year 3
- Moose Survey
- Amphibian (Western Toad) Inventory – Yohin Lake area
- Bull Trout Distribution
- Assessment of Nahanni North Karst
- Spring Bird Migration Monitoring – Rabbitkettle Lake
- Aspen Phenology Monitoring – Rabbitkettle Lake
- Satellite Monitoring of Northern Ecosystems
- Soapberry Monitoring – Rabbitkettle Lake
- River Discharge (Water Flow) Monitoring
- Water Quality Monitoring
- Ice Phenology – Rabbitkettle Lake
- Freshwater Ecosystem Monitoring
- Climate Monitoring – Rabbitkettle Lake, Deadmen Valley, Yohin Lake
- Human Use Monitoring
- Campsite Monitoring
- Rabbitkettle Hotsprings Tufa Mound Monitoring