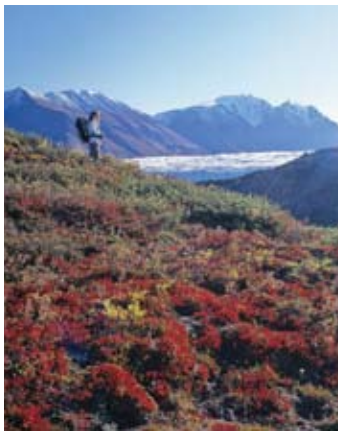
State of the Park Report

Kluane National Park and Reserve of Canada



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Kluane National Park and Reserve of Canada

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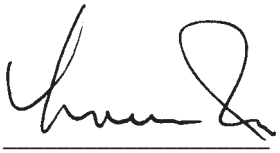

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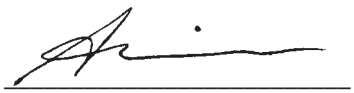

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Acronyms

CAFN	Champagne and Aishihik First Nations
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CRM	Cultural Resource Management
EI	Ecological Integrity
KEMP	Kluane Ecological Monitoring Project
KFN	Kluane First Nation
KNP&R	Kluane National Park & Reserve
KPMB	Kluane National Park Management Board
SOPR	State of the Park Report
TK	Traditional knowledge
VIP	Visitor Information Program
VRC	Visitor Reception Centre
WNSC	Western & Northern Service Centre

Table of Contents

Executive Summary

Kluane National Park and Reserve of Canada (KNP&R), located in southwest Yukon, is an immense region (21,980 km^2) of high mountains, icefields, glaciers and impressive wildlife. Wilderness to some, homeland to others, the park was established in 1976 and is part of an international World Heritage Site. KNP&R is within the traditional territory of the Champagne and Aishihik First Nations (CAFN) and the Kluane First Nation (KFN); recently these Southern Tutchone people's strong ties to the park's lands have been recognized and encouraged.

Parks Canada requires each national park to prepare a five-year state of the park report before launching a management planning process. This is the first such report for KNP&R. The report provides an analysis and assessment of five aspects of the park:

- ecological integrity;
- cultural resources;
- public appreciation and understanding;
- visitor experience; and
- cooperative management.

The report also assesses major management actions taken in recent years and identifies key issues and challenges facing the park. This will inform future decision-making in the next review of the management plan. Developed with the park's cooperative management partners — the Kluane National Park Management Board, CAFN and KFN — the report also provides an opportunity to communicate the state of the park to local communities, visitors and other interested parties.

State of Ecological Integrity

"Ecological integrity is the cornerstone underlying the management of national parks and the long-term preservation of biodiversity and harmonious biological dynamics" (Parks Canada Agency 2007a, p. 12).

Ecological monitoring provides information about the park's ecosystems and is the most advanced of the park's assessment programs. Ecological monitoring reports on five[1] distinct park ecosystems (referred to as bioregional indicators):

- icefields and glaciers;
- forests;
- tundra;
- freshwater (rivers, streams and lakes); and
- wetlands.

Within each ecosystem, a suite of measures provides the basis for an assessment of its condition: green, or good ●; yellow, or fair ▼; red, or poor ■; and grey, or not rated ◆.

The same suite of measures is also the basis for assessing trend, which is indicated by arrows (Table E1; see Table 1, page 3 for explanation of symbols). In some cases thresholds have been established, enabling a quantitative assessment; in others, a more qualitative assessment was conducted.

Cultural reintegration of the Southern Tutchone people is also recognized as a key component of the park's ecological integrity and has been assessed qualitatively with First Nations partners. Elements of traditional knowledge have been included in this report; however, with the help of projects such as "Healing Broken Connections," a more complete and thorough approach to integrating traditional knowledge will be a major objective for the next SOPR.

1. A sixth northern bioregional indicator (marine) is not found in KNP&R.

Table E1. Indicators: Ecological integrity

Indicator (ecosystem)	Condition and trend of ecosystem	% of park area	Number of measures	Rationale for ranking
Icefields and glaciers		79.5	1	The melting rates of icefields and glaciers in the region appear to have tripled recently in response to the changing climate (Arendt et al. 2002). This may be affecting summer water levels and sedimentation levels in glacier-fed rivers and streams.
Forests		9.0	9	The park's forests have experienced major ecological changes during the past decade and changes continue in the populations of many plants and animals. A massive outbreak of spruce bark beetle over the last 13 years has affected mature spruce trees over more than 350,000 ha in the region. Healthy forest populations include red squirrels, snowshoe hares, mice and voles, bearberry and mushrooms. Populations of concern include moose, arctic ground squirrels and certain bird species; the population of spruce bark beetle is a concern because of its high numbers. Because the park's forest ecosystem is in a period of abrupt change it needs to be carefully monitored. The status of the park's forest is on the border between a green and yellow rating. However, since it is believed that the effects of climate change will worsen In future years, the park's forests have been assigned yellow status and a downward arrow, indicating their declining ecological integrity.
Tundra		8.3	5	While current monitoring efforts focus on large mammals and recreational use, long-term databases (that increase confidence in the data) and declining backcountry recreational use result in this ecosystem being assigned a green rating. The park has a number of Dall's sheep populations; roughly 75% are stable and 25% show significant population change. The mountain goat populations in the park appear to be stable. Recent data suggest that the grizzly bear population in the park and region is marginally stable, close to carrying capacity and likely declining at 3% per year. The park does not supply enough habitat to support this regional population. Recreational use patterns are changing — day use is increasing and overnight backcountry use is decreasing. Progress has been made in the past decade to mitigate recreational use impacts.
Freshwater		3	3	Most of the park's streams are out-flowing. Water quality for one of the two in-flowing streams is rated as good. Long-term monitoring of a rare population of kokanee salmon shows significant decline since 2002 for unknown reasons. Park managers conclude that there are insufficient measures to evaluate the ecological integrity of the park's freshwater ecosystems.

Indicator (ecosystem)	Condition and trend of ecosystem	% of park area	Number of measures	Rationale for ranking
Wetlands		0.2	1	A small but important component of the park, wetlands support plant communities and animal populations that are characteristic of wetland habitats. There are insufficient measures to evaluate the ecological integrity of the park's wetlands.
Cultural reintegration		n/a	Not yet determined	The need for cultural reintegration dates back to 1942 when First Nations people were removed from the area that became parklands. This caused considerable hardship and contributed to a significant loss of TK related to the park area. Although significant progress has been made in recent years, especially related to Southern Tutchone people reconnecting with their traditional territory within the park, much work remains to be done.

State of Cultural Resources

The cultural resources of KNP&R encompass the history of human occupation and activity in the park from as early as 8,000 years ago to the present day, and reflect First Nations' life, mining, exploration, mountaineering and recent use.

The park has both tangible and intangible resources. Archaeological sites, and the collections of artifacts collected from these sites, constitute tangible evidence of past land use in the park. Intangible cultural resources include oral history, place names, songs and stories, and traditional knowledge of place and the ecosystem (Table E2).

Intangible cultural resources have been impaired by the displacement of three generations of local First Nations people from their traditional lands within the park since the end of World War II. The elders who have first-hand knowledge of the park, its places, stories and resources are aging; there is a need to focus attention on the recording and transmission of their knowledge.

The 253 documented archaeological sites are threatened by a number of natural processes. Managing these resources is hampered by an incomplete inventory, which can only be expanded by systematic, ongoing archaeological surveys. In addition, 40 of the documented sites have not been formally assessed, and there is no systematic monitoring of known resources.

Table E2. Indicators: Cultural resources

Indictor	Condition and trend	No. of evaluation criteria	Rationale for ranking
Archaeological sites		4	Archaeological work since the 1997 national State of the Parks Report has resulted in a two-thirds increase in the number of documented sites, although there are significant areas of the park where no survey work has been conducted. The three main threats to resources are erosion (72%), structural decay (39%) and wildfire (36%).
Archaeological collections		4	The archaeological collection of 15,825 specimens housed in Winnipeg is well maintained.
Historic objects		4	The collection of historic objects is small and consists of display items and a small number of items gathered opportunistically from within the park. The size of this collection is not sufficient to warrant proper collections management treatment on site.
Cemeteries and burial sites		4	Only one gravesite has been documented in the archaeological record and is in poor condition.
Archival collections		4	The extent of on-site archival material related to the history and operation of the park is not defined, nor is the condition of this material known. Although archival collections represent a small part of the park's cultural resources, efforts are being made to improve their care and management.
Intangible cultural resources		3	Until final agreements were signed with CAFN and KFN, three generations of First Nations residents were denied access to their traditional lands within the park. Traditional knowledge of the park area and its resources is vitally important to maintaining the cultural record and ecological integrity of the park. There has been no systematic documentation of First Nations oral history or traditional knowledge related to the park. Immediate action is required to address this gap.
Messages related to cultural resources			Messages related to cultural resources have been delivered by the park, but have not been developed in a systematic way. It is not clear what messages various audiences are receiving and understanding about cultural resources.

State of Public Appreciation and Understanding

Education is a key component of Parks Canada's integrated mandate and plays a fundamental role in maintaining the park's ecological integrity and in providing meaningful experiences to park visitors and users.

Promoting public appreciation and understanding involves programs and activities aimed at reaching Canadians at home, at leisure, at school and in their communities. The objective is to inspire their long-term support and shared stewardship of protected areas such as KNP&R. Based on national direction, in-park interpretation is now included under visitor experience (see next section). Since this is a recent change, this SOPR includes in-park interpretation under public appreciation and understanding.

Public appreciation and understanding includes four main components:

- in-park interpretation and heritage presentation (including interpretive facilities and personal programs);
- outreach education and community programming;
- visitor participation, understanding and satisfaction; and
- active support from visitors and stakeholders.

Quantitative information sources such as national Visitor Information Program (VIP) surveys and a 2005/06 visitor centre survey were combined with more qualitative analysis from experienced park staff to provide an assessment of visitor and student participation, visitor understanding, visitor satisfaction and active support (Table E3). This analysis helped clarify where data is lacking and where data collection needs to include a greater range of visitors and users.

Table E3. Indicators: Public appreciation and understanding

Indicator	Rank	Rationale for ranking
Visitor and student participation		Parks Canada's national target is 50% of visitors participating in a learning experience. A 2005/06 survey indicated that 87% of respondents viewed exhibits and/or read park brochures and literature. Approximately 30% of visitor centre visitors view the audio-visual program. Inconsistent collection of visitor statistics makes it difficult to determine the percentage of visitors who attend various park interpretive programs. There is also no clear definition of what "learning experience" means. A modest outreach school program is delivered annually, primarily to Grade 7 students in local schools and in Whitehorse. While some community members participate in park programs and some successful culture camps have been hosted by CAFN, KFN and Parks Canada, more work is required.
Visitor understanding		Parks Canada's national target is for 75% of visitors to understand the significance of the park. A recent survey indicated that 60% of visitors do so. More measures are required to gain insight into understanding levels of a broader range of visitors and other audiences, including students and local community members.
Visitor satisfaction		Parks Canada's national target is 85% of visitors satisfied with on-site and outreach programming, including at least 50% very satisfied. Visitor satisfaction at KNP&R ranged between 78% and 100%, depending on the interpretive activity. Other survey results indicate that the park's existing interpretive materials are not those programs and products given a high level of importance by visitors.
Active support		A 2002 visitor survey found different levels of support for key management plan priorities such as protection of critical wildlife habitat (82%), working with others to maintain the ecosystem (75%), and re-establishing First Nations' connection to the land (26%). National targets have not yet been set in the area of active support, and methods of measuring support and data are lacking.

State of Visitor/User Experience

For more than 30 years, KNP&R has been valued as one of Canada's premier wilderness mountain parks, offering a range of high-quality visitor experiences, including mountaineering, rafting, camping and backcountry hiking. People come from around the world to experience the park's wilderness character. A visitor's experience is the cumulative outcome of all aspects of the visit. These include pre-trip and on-site planning, visitor services, programs and infrastructure, reception, campgrounds, hiking trails and other recreational activities and visitor safety.

KNP&R identifies three primary user groups for the park: visitors, local users and First Nations citizens (use by First Nations is included in Chapter 4; ecological integrity under cultural re-introduction). Surveys (including the VIP and other more detailed studies) and a Visitor Experience Assessment were used to assess understanding of visitors/users, opportunities provided and delivery of high-quality service. There was insufficient information and means of measuring to assess the indicator "connecting visitors/users personally with place" (Table E4).

Table E4. Indicators: Visitor/user experience

Indicator	Rank	Rationale for ranking
Understanding visitors/users		Quite a lot is known about KNP&R's current backcountry users and various tools have been used to understand visitor and user groups, but there is a need to consolidate and simplify types of audiences. In addition, little research has been done on potential audiences and the various audience groups are not well prioritized.
Providing opportunities		Information is conveyed to visitors/users in a variety of ways, including the park's website, brochures, signs and discussions with park staff at visitor centres. The current visitor/user offer ranges from a lack of a sense of arrival at the park to a high level of personalized service (for mountaineers). Objectives for visitors' experiences have been established for the park's seven major geographic areas and tourism operators provide a range of recreational opportunities in the park. Way finding and signs and capital assets received red ratings, however, as many capital assets are outdated and poorly maintained. These deficiencies have been recognized for several years and major capital projects are underway to rectify some of them (e.g., KNP&R VRC recapitalization and trailhead signage).
Delivering high-quality service		Parks Canada's national target is 85% overall visitor satisfaction, including at least 50% very satisfied. In a 2005/06 survey, 97% of respondents reported being satisfied (18%) or very satisfied (79%). Some services, however, such as high quality of service, value for money and availability of pre-trip information, failed to meet the 50% "very satisfied" rating. Mechanisms are needed to measure satisfaction from users such as school groups, bus groups and local residents.
Connecting visitors/users personally with place		Insufficient information

State of Cooperative Management

The Kluane National Park Management Board (KPMB) was created in the mid-1990s as a result of the CAFN Final Agreement and later expanded as a result of the KFN Final Agreement. An advisory board, it provides advice to elected representatives and officials of KNP&R, CAFN and KFN and is an important vehicle for implementing cooperative management of the park.

Although assessment of cooperative management is not a national requirement in state of the park reports, there was local interest in it. This was done through telephone interviews with board members and people who have regular contact with the board. Board processes, board relations, outcomes and current and emerging issues for board attention were examined.

Cooperative management is seen as an evolving process. Current strengths include board members' respect for each other and commitment to cooperative management; positive board interaction and the fact that consensus is usually reached; perceived influence in setting priorities; and completion of successful projects (such as guided snowmobile trips, hosting a recent national cooperative management conference and the development of the current park management plan). Current weaknesses and areas for improvement include confusion about the board's roles and responsibilities and accountabilities; the board's interaction and relationships with non-board members; perceived lack of credibility with CAFN; and the need for more training around expectations, roles and responsibilities, effective board operations and communication skills. The overall effectiveness of cooperative management was rated in the middle, with most respondents indicating support and commitment to the process.

Due to the qualitative nature of the assessment, the individual measures were not rated but cooperative management was rated overall as yellow (fair).

Key Issues and Challenges

Several key issues and challenges were identified through the assessments completed in the development of this report (Table E5). They will help inform the next review of the management plan.

Table E5. Key issues and challenges facing the park

Ecological integrity	**Climate change:** Changes in the park's ecosystems due to climate change are apparent (such as increased melting rate of glaciers, unprecedented outbreak of spruce bark beetle and northern expansion of southern mammals). Continued monitoring is important and future adaptation may be necessary. **Traditional knowledge (TK):** TK related to the park area, a key contributor to the park's ecological integrity, has diminished in recent decades. Efforts are underway to help Southern Tutchone people reconnect with their traditional lands within the park. Mechanisms are needed to help integrate TK into park decision-making. **Adjacent land use**: Current and anticipated increase in land use adjacent to KNP&R, including forestry, pipeline development, highways and community growth raise ecological concerns. **Recreational use:** A decline in backcountry use, an increase in day-use, a decrease in human/bear interactions and maintenance of the park's wilderness character resulted in a green rating for this measure. However, a precautionary approach suggests the need for ongoing monitoring and management of recreational use. **Monitoring of ecological integrity:** Monitoring has been conducted in the park and region for decades. Recent national direction, data analysis and work on this report have contributed to the recognition of the need to refine the existing monitoring program.
Cultural resources	**Intangible cultural resources:** Intangible cultural resources, e.g., oral history, place names, songs and stories, are under threat for a variety of reasons, including previous exclusion of First Nations people from the park area, the aging of elders and changes in lifestyle. Various methods are needed to enhance and strengthen intangible cultural resources in Southern Tutchone traditional lands, including the park. **Tangible cultural resources:** Erosion, through wind and water, and structural decay and damage from wildfire will have the greatest impact on archaeological sites in the future. The inventory and recording of new and existing sites is important. **Cultural resource management:** CRM work has been undertaken since park establishment, but the lack of a statement of cultural resource values and lack of an overall CRM strategy make it difficult to move ahead in an effective manner.
Public appreciation and understanding	**Lack of an interpretation and outreach plan:** This has left gaps in the program. **On-site interpretive media:** Much of KNP&R's on-site interpretive media (exhibits, signage, self-guided interpretive trails), as well as the main audio-visual presentation, are old and outdated. Significant steps are being taken to improve this situation. In addition, the type of media provided does not reflect visitors' rating of the importance of different interpretive media. **Visitor/user satisfaction:** The availability of interpretive activities does not meet national targets; visitors see the current offer as insufficient. Also, current programming for local community members, an important park audience, has had limited success. New methods are needed to engage local people. **Data and research:** A lack of data and research affects the staff's ability to design and deliver programs and products that meet the needs of visitor/user groups and limits their ability to evaluate results. Areas of particular concern are collection of statistics; methods of assessing program effectiveness and understanding; understanding of audience motivations, needs and expectations; and defining and monitoring ways in which audiences actively support management actions for achieving or maintaining the park's ecological integrity.

Visitor experience	**Visitor trends:** Recently there has been a decline in visitors to the park's VRCs, campground and overnight backcountry use and an increase in day use. A better understanding of the interests and motivations of current and potential visitors is needed to inform decision-making related to visitor opportunities, ecological integrity and education. **Capital assets:** Visitor services assets, e.g., the KNP&R VRC, are old and in need of recapitalization, or are lacking (for example, there are no day-use facilities in the north end of the park). Capital asset planning requires detailed information about current and potential visitor needs and expectations. **Sense of welcome:** Visitors do not experience a strong sense of welcome when they arrive, as there are no park gates, identity signs on the main highways or orientation exhibits. Some travelers in the region pass by the park without being aware that it is there. **Park trails:** Backcountry hiking has been a primary focus since the park was established. In recent years, backcountry use has declined, maintenance of trails has become more challenging and ecological integrity concerns have surfaced. A more in-depth integrated examination of the park's trail offer is needed.
Cooperative management	**Common understanding:** There is a lack of a common understanding about what exactly cooperative management is and what it means in practical terms with respect to KNP&R. Lack of clarity leads to confusion and frustration about board roles and responsibilities and ensuing priorities and actions. **Relationships and communication:** While interactions among board members are positive, there is a need to improve their interactions and relationships with non-board members including park staff. More effective communication with the broader community is also needed. **Credibility:** Opinions differ concerning the board's credibility with different groups in the community. Most noteworthy is the fact that 60% of the board perceived the board's credibility with CAFN as poor. Frank discussions among the board, CAFN and Parks Canada about CAFN's expectations of the board would be helpful.

1. Introduction

This is the first State of the Park Report (SOPR) for Kluane National Park & Reserve of Canada (KNP&R).[1] It provides an analysis and assessment of Parks Canada's integrated mandate:

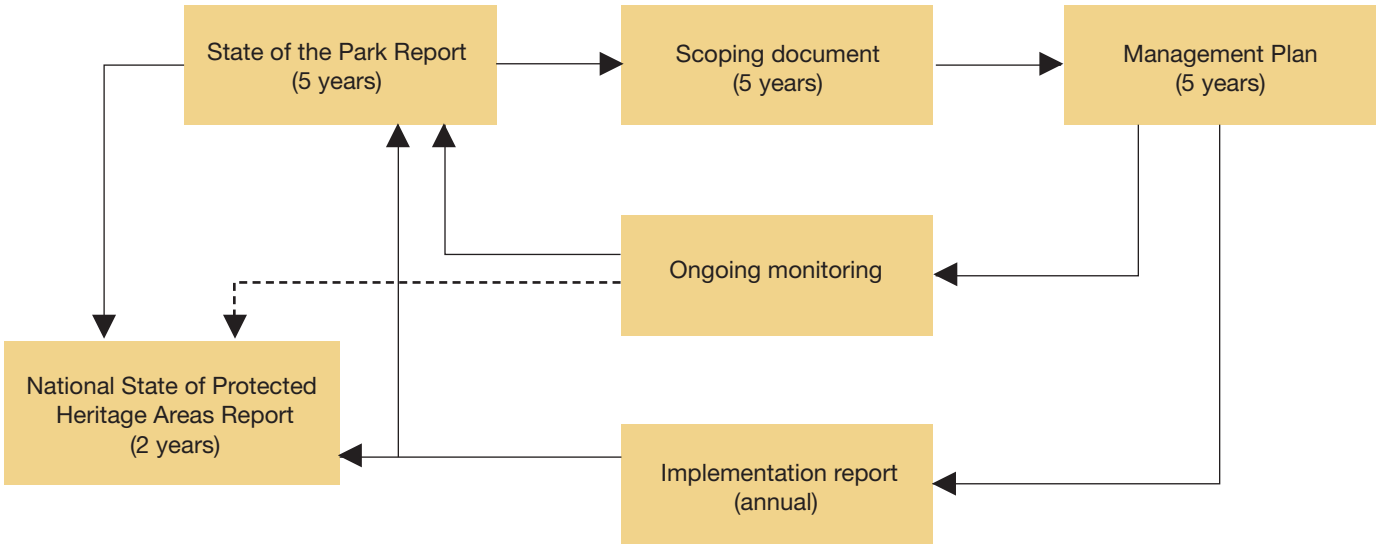
- protection (ecological integrity[2] (EI) and cultural resources);
- education (public appreciation and understanding); and
- visitor experience (providing opportunities for memorable and meaningful visitor experiences) (Figure 1).

The SOPR also assesses the state of the park's cooperative management regime and key management actions taken in recent years to address important issues. The assessment concludes by identifying key issues and challenges facing the park.

SOPRs are a relatively new national requirement. They grew out of a recommendation from the national Ecological Integrity Panel (2000) and have recently expanded to include the other components of Parks Canada's mandate. The SOPR fits within the five-year cycle of national park management planning (Figure 2) and the key issues it identifies inform the Scoping Document that in turn leads to a management plan review.

Figure 1. Parks Canada's integrated mandate

Figure 2. Role of SOPR in park planning, monitoring and reporting process



1. The terms "park" and "KNP&R" are used interchangeably throughout the report and refer to both the park and the park reserve.
2. Ecological integrity "means, with respect to a park, 'a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic components and the composition and abundance of native species and biological communities, rates of change and supporting processes'" (Parks Canada Agency 2006f).

The report also provides an opportunity to communicate the state of the park to partners, local communities, visitors and interested individuals.

A steering committee was established with representatives from Parks Canada, the Kluane National Park Management Board (KPMB), Champagne and Aishihik First Nations (CAFN) and Kluane First Nation (KFN). The committee oversaw the development of the SOPR; a number of working groups developed the different sections. After review by national office staff, the SOPR was recommended by the park superintendent, KPMB, CAFN and KFN and approved by the Yukon Field Unit Superintendent.

1.1 SOPR Components and Assessment Methods

Ecological integrity (EI) monitoring is the most advanced of the assessment programs. Parks Canada has a national commitment to develop fully functioning EI monitoring and reporting systems for all national parks by March 2008 (Parks Canada Agency 2006d). KNP&R's EI was assessed by evaluating five bioregional indicators[3] of ecological health identified for the Northern Bioregion[4] national parks (Figure 5):

1. icefields and glaciers;
2. forests;
3. tundra;
4. freshwater (rivers, streams and lakes); and
5. wetlands.

This section of the report also includes an assessment of cultural integration, an important component of EI and one that is determined at the park level.

The condition and trend of a suite of relevant field measurements provide information about each of these five ecological indicators. This report assesses monitoring data available as of November 2006; at that time, the condition of the data varied considerably.

Mount Logan. Parks Canada/W. Lynch

Elements of traditional knowledge have been included in this report, however it was not possible to integrate traditional knowledge to its fullest extent at this time. A more complete and thorough approach to integrating traditional knowledge will be a major objective for the next SOPR.

The park's EI monitoring program is under review. The review includes an internal assessment (Parks Canada Agency 2006a), community input, and First Nations input. The objective is to ensure that the integrated EI monitoring program accomplishes the following goals:

- measures key factors in each of the park's major ecosystems;
- ensures that these measures are spread across the three monitoring categories (biodiversity, ecological functions/processes and stressors); and
- incorporates scientific, traditional and local knowledge.

Cultural resources were assessed using a template adapted from the evaluation of cultural resources in national historic sites. Cultural resource specialists from the field unit, Western & Northern Canada Service Centre and local First Nations were consulted during the assessment. Archaeological sites, archaeological collections, historic objects, cemeteries

3. A sixth northern bioregional indicator (marine) is not found in KNP&R.
4. A bioregional approach groups national parks with similar ecosystem properties. KNP&R is part of the Northern Bioregion Working Group, along with Nahanni, Tuktut Nogait, Vuntut, Auyittuq, Sirmilik, Ivvavik, Aulavik, Wapusk, Quttinirpaaq, Ukkusiksalik and Torngat Mountains national parks (Parks Canada Agency 2006c).

and burials, archival collections and intangible cultural heritage were assessed, examining threats, condition, evaluation, management practices and actions and messages related to cultural resources.

National performance indicators for public appreciation and understanding are being developed. Primary data sources for this report include a 2005/06 visitor survey (VIP), a 2002 Kluane Wilderness Study (Haider and McCormick 2004), visitor statistics and park staff. Participation, understanding, satisfaction and active support were assessed.

National performance indicators for visitor/user experience are also being developed. Primary data sources for this report include a 2002 Kluane Wilderness Study (Haider and McCormick 2004), an exit survey by the Yukon Department of Tourism & Culture (Government of Yukon 2006), a 2005/06 visitor survey (Visitor Information Program, or VIP; Parks Canada 2006b), a 2005 KNP&R economic impact analysis (Zanasi et al. 2005) and a 2006 visitor experience assessment (Parks Canada Agency 2006e) completed by field unit staff and partners. Understanding visitors/users, providing opportunities and delivering high-quality service were assessed.

An interview questionnaire specific to the park was developed and administered to assess cooperative management in the park. Board processes, board relationships, outcomes and current and emerging issues for board attention were assessed.

Indicators for protection, education, visitor experience and cooperative management were rated for condition and trend. Symbols and colours represent the condition and trend of the indicators and measures (Table 1).

Table 1. Symbols used to evaluate indicators

Condition			Trend		
good	the condition of the indicator/measure is satisfactory		improving	the condition of the indicator/measure is improving since the last assessment	
fair	there is concern about the condition of the indicator/measure		stable	the condition of the indicator/measure has not changed since the last assessment	
poor	the condition of the indicator/measure is unsatisfactory		declining	the condition of the indicator/measure has worsened since the last assessment	
not rated	there is insufficient information to determine the condition of the indicator/measure				

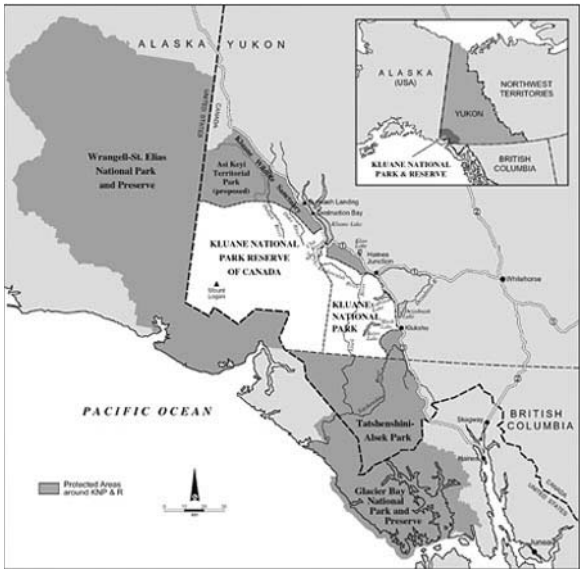
Source: adapted from Parks Canada 2007b.

2. Context

2.1 Introduction

Kluane National Park & Reserve lies in the southwestern corner of the Yukon, part of the traditional territories of CAFN (CAFN) and Kluane First Nation (KFN). Parks Canada, the Kluane National Park Management Board (KPMB) and the two First Nations cooperatively manage the park. Collectively, four national and provincial parks form the Kluane/Wrangell-St. Elias/Glacier Bay/Tatshenshini-Alsek World Heritage Site (97,520 km^2), the largest international protected area in the world (Figure 3).

Figure 3. Map: Regional setting



2.2 Ecological Context

The heart of KNP&R is the St. Elias Mountains, the youngest and some of the largest mountains in North America, with some of the largest non-polar ice caps and valley glaciers in the world. These mountains create a barrier between the Pacific Ocean and the plateaus of the Yukon interior, creating a rain shadow in their lee and an arid boreal climate in the eastern and northern parts of the park. Kluane is a vestige of the ice age; the winds, dust storms, weather patterns and nutrients generated by icefields and glaciers influence many of the ecological processes of the greater Kluane ecosystem.

The park's other major mountain range is the Kluane Range, which borders the Alaska Highway and Haines Highway (Figure 4). Between the Kluane Range and the Icefield Range lies the Duke Depression, a complex of productive montane, subalpine and alpine areas. At present 18 percent of the park area is vegetated, largely a narrow green belt along the park's eastern boundary. Ecologically these are the most productive lands of KNP&R. They have been inhabited for thousands of years by Aboriginal people, whose close association with the land has created an important body of traditional knowledge. Officially excluded from the park area from the early 1940s until the mid-1970s, CAFN and KFN citizens are only now starting to spend time back in the park and reconnect with the land. Assisting these Southern Tutchone people reintegrate with the park area, through programs such as "Healing Broken Connections"[5] is a high priority; their involvement is seen as providing a significant contribution to ecosystem management.

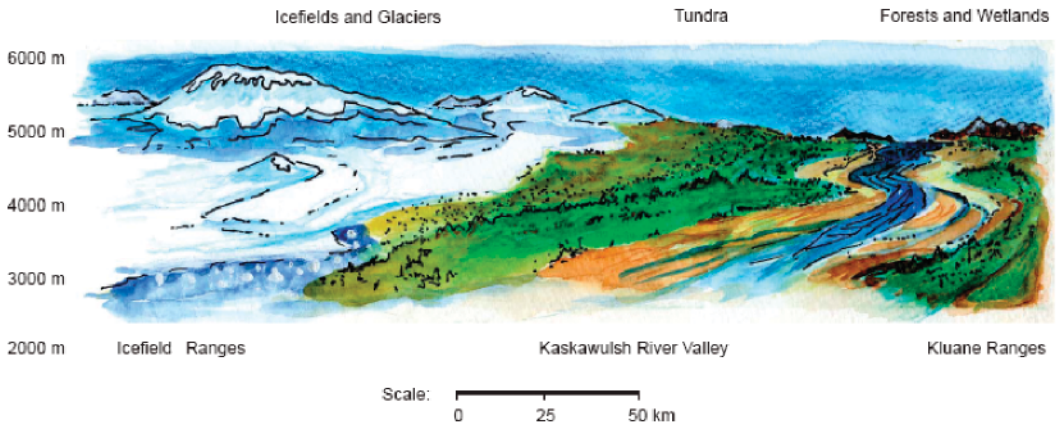
Since the mid-1990s, a significant outbreak of spruce beetle has killed mature white spruce trees scattered over 350,000 hectares in the region (Berg et al. 2006).

KNP&R's population of grizzly bears is a significant wildlife resource and is considered an indicator of the health of the Kluane ecosystem. The grizzly bears that inhabit the park's glacial valleys have large home ranges and constitute one of the most viable populations of this species in any Canadian national park (McCann 1998). Equally significant is the park's population of Dall's sheep. This ungulate is more characteristic of the park's northern areas, especially the alpine and subalpine zones of Tachàl Dhãl (Sheep Mountain) and the headwater areas of the Ä'äy Chù (Slims River) and Donjek River watersheds. Within the past century, caribou were found in the park area, but some caribou populations have declined, and migratory caribou herds no longer move through

5. "Healing Broken Connections" is a multi-year nationally funded Ecological Integrity Theme Project with two primary objectives: to reintegrate First Nation people back on the land within KNP&R; and to determine how traditional knowledge might be used in the park management decision-making process.

Figure 4.
Elevation of KNP&R: Key ecosystem components

Illustration:
Brent Liddle



the area. A small herd of caribou is periodically found in KNP&R, primarily in the Burwash Uplands near the park's northeastern boundary. Furbearers such as wolves, coyotes, red foxes, lynx, wolverine and other mustelids continue to inhabit the park and the surrounding areas.

The diversity of habitats found inside and adjacent to the park contributes to a great variety of bird life. Over 180 species have been reported, including a recent increase of Trumpeter swans and populations of raptors such as Peregrine falcons, gyrfalcons and Bald and Golden eagles. The lakes and streams of KNP&R contain lake trout, northern pike, arctic grayling and several other fish species. The unique land-locked kokanee salmon of Sockeye, Louise and Kathleen lakes are especially significant.

The 2004 KNP&R management plan assigned the park a high degree of ecological integrity (Parks Canada Agency 2004b) but listed a number of environmental stressors known or believed to be affecting park ecosystems. Several of the regional stressors (e.g., increased development along highways, forest harvesting, hunting, snowmobile and all-terrain vehicle use) relate to current and anticipated adjacent land uses.

The State of Protected Heritage Areas for the Period Ending March 31, 2005 (Parks Canada Agency 2005) assessed eight elements of EI in each of Canada's national parks.[6] KNP&R received a green — or positive — rating for the seven elements assessed. This first SOPR for the park assesses similar but not identical measures of ecological integrity and provides updates to the 2005 national report.

2.3 Species at Risk

The park and adjacent areas provide a seasonal or year-round home to nine wildlife populations that have been designated as Endangered, Threatened or Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Some of these populations are listed in Schedule 1 of the federal *Species at Risk Act* (SARA) and some are listed with COSEWIC (Table 2).

Certain monitoring protocols (see 5.4.2.6: Birds and 5.4.3.3: Grizzly Bears) survey several of these species in and adjacent to the park. A KNP&R warden is involved in developing a recovery strategy for Baikal sedge.

2.4 Social Context

The village of Haines Junction (with a population of approximately 800) is located at the intersection of the Alaska Highway and the Haines Highway just outside the park boundary. Haines Junction houses the park administrative headquarters and the main visitor centre (VRC). Other communities adjacent to the park include Klukshu, Destruction Bay and Burwash

6. The eight elements assessed were diversity; predator and prey; species loss; plant growth; development area; population density; internal roads. Forest fire as a land process was not evaluated for KNP&R due to lack of data.

Table 2. Species at Risk in or adjacent to the park

	Species	Status
Species at Risk listed in Schedule 1 of the *Species At Risk Act* (SARA)	Baikal sedge, *Carex sabulosa*	Threatened
	Wood bison, *Bison bison athabascae*	Threatened
	Woodland caribou, *Rangifer tarandus caribou*	Special Concern
	Peregrine falcon (Anatum) *Falco peregrinus anatum*	COSEWIC has recently changed its status from Threatened to Special Concern
Species at Risk listed by COSEWIC but not yet listed in Schedule 1 of SARA	Grizzly bear, *Ursus arctos* (northwestern population)	Special Concern
	Wolverine, *Gulo gulo* (western population)	Special Concern
	Short-eared owl, *Asio flammeus*	Special Concern
	Rusty blackbird, *Euphagus carolinus*	Special Concern
	Common nighthawk, *Chordeiles minor*	COSEWIC has recently classified this species as Threatened

Landing. The Haines Highway runs 256 km south over the scenic Chilkat Pass to Haines, Alaska, a port of the Alaska Marine Highway that connects Alaska with the southern 48 states.

For nearly 30 years, KNP&R has been valued as one of Canada's premier wilderness mountain parks. Images of the park are featured prominently in the promotional campaigns for the Yukon tourism industry. These images are responsible in part for the park's appeal as a unique wilderness area that attracts recreational visitors from all over the world. The park is also important to residents in local communities and other Yukoners as a place to make a living, visit with family, hike and fish and appreciate as a protected heritage area.

Recent surveys have revealed that the most popular recreational activities in the park are hiking, viewing wildlife, visiting the VRCs at Haines Junction and Tachàl Dhāl, fishing and photography. Flightseeing, mountaineering, rafting, skiing and vehicle-based sightseeing are also popular. Social science research has revealed that encountering untouched nature, experiencing solitude and viewing wildlife in a natural setting are important underlying motivations for people who visit the park. Spending time with family and friends is important for local residents who use the park for recreation.

KNP&R day-use visitation is estimated to be 6,500 to 7,500 per year; overnight backcountry use averages 1,025 per year over five years. An estimated 1,500 visitors a year enjoy a wilderness experience through aircraft flightseeing, and this number is increasing.

The CAFN land claim agreement came into effect in 1995, the KFN land claim agreement in 2004. This, along with the creation of the KPMB, has brought a new era of cooperative management to the park. After many years of hardship caused in part by First Nation citizens being excluded from the park, efforts are underway to encourage the cultural reintegration of First Nations into the park through projects such as "Healing Broken Connections."

Cooperative management is increasing the involvement of local First Nations and local communities in park management, and social science is helping park managers learn more about visitor/user trends, motivations and satisfaction. This in turn contributes to improved facilities and services. Outreach and education efforts are also slowly increasing.

3. First Nation Voices: Traditional Knowledge

It is with pleasure and an eye to the future that we include this introduction to Traditional Knowledge (TK). KFN, CAFN and Parks Canada have been working together over the past five years to improve their working relationship and begin to explore ways of integrating TK into the management of KNP&R. The goal of this section is to provide a brief understanding of TK from the First Nations' perspective, and give a sense of how it might be respectfully used in understanding the ecological integrity of the park.

TK is unique to each First Nation and there is no one clear definition of what it is. Certain components are common to each First Nation:

- TK is fundamental to the identity of the First Nation and its citizens and is integral to the First Nation's culture, values, and beliefs;
- TK is integral to the cultural, political and economic distinctiveness and social well-being of the First Nation and its citizens;
- TK includes knowledge that is held by individuals, groups of individuals, families or the collective as a whole;
- TK is steeped in the traditions, culture and history of the community and is closely linked to the environment. It is holistic in nature, linked to the community's spiritual beliefs, way of life, connections to the land and practices; and
- TK originated in the First Nation's traditions, constantly evolved over time and has contemporary applications.

TK is holistic in nature. It does not lend itself well to inclusion in the format of the measure-by-measure assessment adopted for the current State of the Park Report. TK in its fullest sense is a different way of knowing the world, a different way of organizing thought and observations, outcomes and connectedness. It is this inherent understanding and relationship to the land that has allowed First Nations people to survive and even thrive in the region despite a harsh and changing environment.

It is no easier for Elders to write down all their traditional knowledge than it is for a person to share all their "common sense." They can describe some examples of it, or perhaps tell you when they have used it, but you cannot write it down in a finite and systematic list. TK expertise is gained by a life lived well on the land; it is an expertise that may be less obvious to those outside the community.

One of the challenges of integrating the two ways of looking at the world is a fundamental difference in worldviews. In the Southern Tutchone way, people and animals live together as part of the land and people view themselves as part of nature, not apart from nature.

Although the ways of looking at the world may differ, there are also similarities between scientific knowledge and traditional knowledge, but these similarities may not be obvious to someone from outside that worldview. For example, peer review is important in both cultures. Scientists review each other's work, or are made to "prove it." In the Southern Tutchone way, there are experts in each area that may be based on geography, skill, family or gender. First Nations experts will defer to one another, but an outside researcher may not be aware of those subtleties.

Both knowledge systems rely heavily on observation. The First Nations lifestyle and knowledge is based on thousands of years of experiments and the trial and error of living and thriving in a harsh climate.

Within the field of resource management, there is pressure to quantify everything and fit it within ecological models. TK tends to be more qualitative: What is the quality? Is it good, bad, fat, skinny, falls apart when you cook it? How does it taste? A particular challenge for resource managers is an implicit value system that suggests that quantitative science is superior to qualitative science. It is a bias that park managers must work to recognize and overcome with the help of their First Nations partners.

Values are important in both systems but what is valued may differ. Internationally, KNP&R may be valued as UNESCO World Heritage Site, but this may not be relevant or important in the daily lives of people who are noticing changes at

the very local level. Different boundaries can also cause confusion. Park managers may focus attention on the park or the greater ecosystem while local First Nations knowledge is based on their traditional territories.

Both CAFN and KFN are interested in actively promoting the respectful use of TK in park management. Some recent attempts to include TK alongside science — in the park and elsewhere — have fallen short of that goal. In general terms, TK is too often used in piecemeal fashion to support a science-based study or management regime where the outcome is already known.

Ecological indicators and the field measurements that support them are often based on criteria that include relevance, measurability, data availability, attribution, set targets and thresholds. Elements of traditional knowledge can complement this well-established science-based regime.

A more effective approach would be to develop a parallel assessment tool based on TK. It might look quite different than science-based measures. Relevance might be defined as what is important to the Elders and active subsistence harvesters. Measurability could include non-statistical alternatives to abundance: "…lots of, not so many long ago, long ago there used to be…" Assessments of quality are extremely important in traditional knowledge and could prove valuable. Data availability means that there is a way that First Nations people can share and teach their knowledge with others in a tangible way, and have confidence that it will be used appropriately and effectively. It is also fascinating to consider how science can complement traditional knowledge to achieve a greater shared understanding of the processes at work in a particular area.

One fundamental difference between a science-based approach and one rooted in traditional knowledge is the idea of attribution. The idea that you can prove that one thing is caused by another may not be important to First Nations; at times it is more important that something simply is.

Elders tell us we lose much of the integrity of traditional knowledge when we use English instead of Southern Tutchone, or when we write things down instead of experiencing them firsthand or sharing them through oral traditions. It is not just the knowledge itself that is important, but also the act of teaching and learning. Many spiritual dimensions of traditional knowledge cannot be translated or transcribed and it is important to clearly acknowledge those limitations.

TK has been incorporated into this SOPR in small ways. The current format does not lend itself to incorporating the richness TK has to offer, but this compromise is a start. We hope that future reports will allow both knowledge systems to be presented more fully.

Involving the knowledge holders in how the information is used will help ensure respectful use and help develop better ways of incorporating TK in the future. One innovation might include using traditional knowledge holders to help in modeling. For example, it is likely that bison, elk, white-tailed deer and cougar will move into KNP&R. Bison are recently reintroduced to the Yukon; most Elders do not trust them and don't hunt them. Despite this, Elders have given detailed information on bison behaviour to young hunters planning to hunt bison. Even though the Elders do not know the animals well, they use their own intimate knowledge of the land, water, other species and weather to predict how a new species would likely use it. This type of knowledge could prove useful in park management.

Despite different points of view, there is a lot of common ground in the two ways of viewing the world and a better understanding to be gained by looking at both sides. KFN, CAFN and Parks Canada are working on ways of using qualitative tools that will be better suited for TK. First Nations will continue to challenge park managers to consider TK on its own merits, not just when it reaffirms a larger science-based study. By working together, we learn together, can ask better questions of each other and arrive at better answers and solutions.

Champagne and Aishihik First Nations
Kluane First Nation

4. Park vision

The vision statement for KNP&R is found in the 2004 management plan. It describes the desired state of the park in 15 years.

- The park has at least the same high level of ecological integrity today as it had in 2002, based on the top priority of ecological integrity. Principles of precaution and adaptive management are exercised when there is potential for significant adverse effects on the ecosystem.
- Protection and maintenance of critical habitat and wildlife corridors serve to ensure healthy wildlife populations (e.g., grizzly bears, Dall's sheep, wolves, wolverines, mountain goats and Golden eagles).
- Natural processes such as fire, insect outbreaks and floods govern change.
- The enduring cultural relationship between the Southern Tutchone people and the park contributes to the ecological integrity of the regional ecosystem.
- The park is managed on a regional ecosystem basis with the cooperation of Parks Canada, First Nations, the Government of Yukon, local communities and other agencies and groups.
- Cultural resources are documented and interpreted through community-based and scientific research methods. These resources are appropriately managed and their meanings are shared and understood.
- Parks Canada, CAFN and KFN share in the management of the park.
- Ongoing opportunities are provided to the public to contribute knowledge and ideas to park management and operations. The Kluane National Park Management Board acts as a conduit for local people to participate in park management.
- The local First Nation final agreements related to the park are being implemented, bringing economic and employment benefits to CAFN and KFN.

Dall's sheep. Parks Canada/P. Bastien

- Traditional knowledge and scientific knowledge are given full and fair consideration in the protection, management and operation of the park.
- Through interpretation and outreach programs, the public clearly understands the national significance of the park and supports actions that maintain and enhance ecological integrity.
- Local residents, park visitors and the people of Canada take an active role in protecting and sharing the park's natural and cultural heritage.
- Visitors enjoy a range of appropriate recreational activities that are based on experiencing and respecting the park's wilderness character and its natural and cultural heritage.
- The park plays an important role in the region's heritage tourism that is based on the park's wilderness and cultural values.
- The park is a positive contributor to the local economy, within the context of national park values.
- Part of a World Heritage Site, the park is an important symbol of Canada and of Canadian identity recognized by people from around the world.

Parks Canada Agency 2004b, p.16

Figure 5. KNP&R: Key ecosystem components, drivers and stressors

Illustration: Brent Liddle

5. State of Ecological Integrity

5.1 Introduction

This section of the report assesses the park's ecological integrity (EI). The park management plan's strategic goal for ecological monitoring is: "Integrated ecological monitoring programs for the collection, storage, analysis and interpretation of data leads to enhanced ecological integrity in the greater Kluane ecosystem" (Parks Canada Agency 2004b, p. 25). Ongoing regional partnerships have helped fulfill this goal. This SOPR includes data available as of November 2006; the park's monitoring program is currently under review and will be further developed.

The park's five ecosystems, or bioregional indicators (Figure 5; Section 5.4) are discussed here according to their extent of coverage in the park, ranging from wetlands at 0.2% to icefields and glaciers at 79.5%. The park's EI monitoring program is made up of several components:

- monitoring for which KNP&R is primarily responsible (e.g., kokanee spawning counts, ungulate surveys in the park);
- monitoring for which the Kluane Ecological Monitoring Project (KEMP)[7] partners (including KNP&R) are responsible (e.g., snowshoe hare abundance, white spruce cone crops); and
- monitoring that KNP&R carries out with other partners (e.g., Dezadeash River water quality, breeding bird surveys).[8]

Section 5.5 reports on the cultural reintegration of Southern Tutchone people in the park. This is an important component of the park's ecological integrity, manifested through traditional knowledge (TK). At this time, only some elements of traditional knowledge have been incorporated into this report. Efforts such as "Healing Broken Connections" are making significant progress on building relationships and finding meaningful ways of using traditional knowledge in park management. It is anticipated that TK will become an increasingly important part of the next SOPR.

5.2 Thresholds

Broad EI measures that apply to the entire park are discussed in Section 5.3, followed in Section 5.4 by EI measures that apply to one of the park's five ecosystems. Each EI indicator (ecosystem) is assessed by one or more field measures. In most cases thresholds have been established for each field measurement. In this report, a threshold is a change in a population that park managers view as an early warning of significant change in the ecosystem. Throughout this chapter a yellow threshold indicates a moderate level of change in that ecosystem while a red threshold indicates a more serious level of change. Inside the yellow thresholds is the green zone where the population shows natural variation and is judged to be healthy.[9] For the KEMP databases, a running average of two to six years was often used in order to reduce the amount of variation in the annual monitoring data (see Krebs and Henry 2006 for details of this statistical analysis). Thresholds were calculated based on these running averages.

Each measure is assigned a colour associated with its current state (Parks Canada Agency 2007c) and a trend arrow that indicates whether ecological integrity is improving or declining. In a very few cases (such as spruce bark beetle), thresholds have not yet been

7. KEMP is an active monitoring partnership among KNP&R; the Arctic Institute of North America's Kluane Lake Research Station; Yukon College; Yukon Environment; Canadian Wildlife Service; Strategic Forest Management Network and others. It attempts to be an integrated ecological monitoring program for the whole Kluane region, with protocols built on research programs and databases extending back to the mid-1970s (Krebs, Boutin and Boonstra 2001).
8. The full structure of the park's EI monitoring program is described in detail in the 2005/06 annual report of the Kluane Ecological Monitoring Project (Henry et al. 2006).
9. The yellow thresholds include approximately 90% of natural variation shown by this population (1.6 standard deviations from the long-term mean), and the red thresholds include approximately 95% of natural variation shown by this population (2.0 standard deviations from the long-term mean). If the running average crosses a red threshold, there is only a 5% chance that this amount of change would occur based on the population's natural variation, that is, it can be stated with some confidence that regarding this measure, a significant change has taken place in that ecosystem.

established, but the measure was assigned a colour and arrow as a result of a consensus decision on the part of park managers.

The colour and trend assigned to each field measure are then synthesized using a standardized formula that provides a colour and trend for a given bioregional indicator (Parks Canada Agency 2007c).

5.3 Park-wide Measures

5.3.1 Climate change (Stressor)[10]

The climate of the Kluane region appears to be changing in important ways. This is directly or indirectly causing significant changes in the ecosystems of the park (see 5.4.1: icefields and glaciers; and 5.4.2: spruce bark beetle, arctic ground squirrel and bearberry). Changing climate patterns are assessed in this section, although climate is used as a measure for each of the park's five ecosystems.

Thresholds: Not yet established

Assessment: Climate records from Burwash and Haines Junction starting in 1945 show that the average annual temperature and amount of precipitation have increased in the park and throughout the southwest Yukon (Carriere 2003; Berg and Henry 2003). Prolonged periods of severe cold during the winter have decreased in frequency, and temperatures in early to mid-December have increased (Garbutt 2006). Summers are drier. Seven of the ten years from 1989 to 1998 show a decrease in the average amount of precipitation during the summer months.

The Kluane region experienced an unbroken run of warm summers from 1989–1997 (Berg and Henry 2003). This appears to be one of the driving forces behind the outbreak of spruce bark beetle in southwest Yukon and southern Alaska that was first documented in the Kluane region during 1994 (see 5.4.3.2).

While thresholds have not yet been established, documented changes in Kluane's climate lead to the conclusion that changes in the climate of the Kluane region are contributing to a deterioration of the park's EI.

Traditional Knowledge: Climate change

Elders have expressed concern that winters are becoming milder, and they no longer see the extreme cold that they experienced in their youth. They wonder how it affects the furbearers and the kokanee salmon at Kathleen Lake.

5.3.2 Primary productivity (Ecosystem function)

Primary productivity is particularly relevant to the forest and tundra ecosystems. It is currently included as a park-wide measure since the data cannot yet be analyzed at the ecosystem level.

Thresholds: Not yet established

Assessment: Normalized Difference Vegetation Index (NDVI) measurements from AVHRR[11] satellite images are a coarse measurement of plant productivity (total amount of green plant material) at the landscape scale.[12] These are some of the findings for NDVI data analysis from 1993 to 2004 for the northern national parks and specifically for the Kluane region:

- 9 of the 11 national parks across northern Canada exhibited a significant increase in plant productivity, largely from mid-June to mid-August;
- spring green-up in KNP&R varies significantly less than in other northern national parks, and usually occurs between June 10 and 30; and
- these measurements suggest that plants are responding to the changing climate of the North. It is not yet known how these changing patterns will affect the distribution or abundance of wildlife species across the north or in the Kluane region.

10. In the title of each EI measure, the words in parentheses relate to Parks Canada's EI Assessment Framework, i.e., "stressor" means that this measure is relevant to the stressor column of the EI Assessment Framework (Parks Canada Agency 2003).
11. AVHRR – Advanced Very High Resolution Radiometer.
12. Each pixel in the image covers one km^2 on the ground.

5.4 Bioregional Indicators

5.4.1 Icefields and glaciers

Icefields and glaciers and their associated scree and talus slopes cover nearly 80% of the park (Sundbo 2002).[13] While they do not contribute significantly to the park's biological productivity (with the exception of nunataks), icefields and glaciers are important in determining the weather and hydrology of the park and the region.

Arendt et al. (2002) found that glaciers straddling the Alaska-Yukon border and in southern Alaska have melted at an average annual rate of 0.5 metres of thickness since the mid-1950s. These rates have recently more than tripled to 1.8 m per year. This increase in melting rates is keeping the park's glacier-fed streams and rivers at a high water level with heavier sediment loads for much of the summer. The impacts of these recent hydrological changes have not yet been documented.

At present, there are no EI measures for the park's icefields and glaciers. Discussions are underway with glaciologists from the Kluane Research Station and the Geological Survey of Canada to investigate potential cost-effective measures for carrying out this monitoring.

Traditional Knowledge: Icefields and glaciers

Water and how it moves through the landscape is a critical element of traditional knowledge; changes in freeze up and thaw, changes in volume and water quality influence everything on the land. Elders are concerned that too much water is melting from the glaciers. They are concerned about what will happen to water when the snow and ice are gone.

5.4.2 Forests

The forests of the park comprise three tree species: white spruce, aspen and balsam poplar. They form a significant portion of the park's green zone (Sundbo 2002).[14] Since the forests have high vertebrate biodiversity, monitoring their species diversity and primary ecological processes has been emphasized. Recently, Baikal sedge *(Carex sabulosa)*, a sand-dune plant found in the park's montane, has been listed as a threatened species under the *Species at Risk Act*. Parks Canada has taken on the role of responsible federal agency for developing the recovery strategy and action plan for the species, since the Kluane population of *Carex sabulosa* is the largest of the six populations in the Yukon. Parks Canada will work in partnership with all other jurisdictions responsible for Baikal sedge (Yukon government, First Nations, Environment Canada and others as appropriate).

KEMP is a partnership of researchers (see footnote 7). KEMP monitoring is done both inside and adjacent to the park. The resulting databases were analyzed to determine if there were similarities in the patterns in the data collected inside and outside the park. When the data showed a spatial variation of 20% or less (see, for example, Krebs and Henry 2006), it was concluded that patterns were similar. If spatial variation was greater than 20%, then the data was examined more closely.

An Analysis of Variance (ANOVA) was carried out on the long-term KEMP databases, and the variance in each was partitioned into: 1) variation within sampling sites, 2) temporal variation and 3) spatial variation. Spatial variation was higher than 20% for only two of the datasets, red squirrels (33%) and bearberry (23%). However, for both of these populations, their temporal variation was nearly twice their spatial variation.

13. Icefields and glaciers cover 57.2% of the park (Sundbo 2002). Scree and talus slopes cover an additional 22.3%. Combined, they form 79.5% of the park, constituting the dominant park ecosystem.
14. Forests cover 6.4% of the park area (Sundbo 2002). Forests grade into shrublands which change into alpine tundra at higher elevation or wetlands in low-lying depressions. Shrublands cover 6.2% of the park (Sundbo 2002); 40 percent of the shrublands has been assigned to the forest ecosystem (expert staff opinion), resulting in forest covering 9.0% of the park.

Nevertheless, spatial patterns may vary more for red squirrels and bearberry than for the other KEMP measures and are reflected in the statements given below.

Traditional Knowledge: Forests

Elders are concerned about the forest dying from spruce beetles and how quickly water moves through the land, and how this will affect the animals. They do not hear as many birds. Colder winters and fires used to help keep the forest healthy.

5.4.2.1 Moose (Biodiversity)

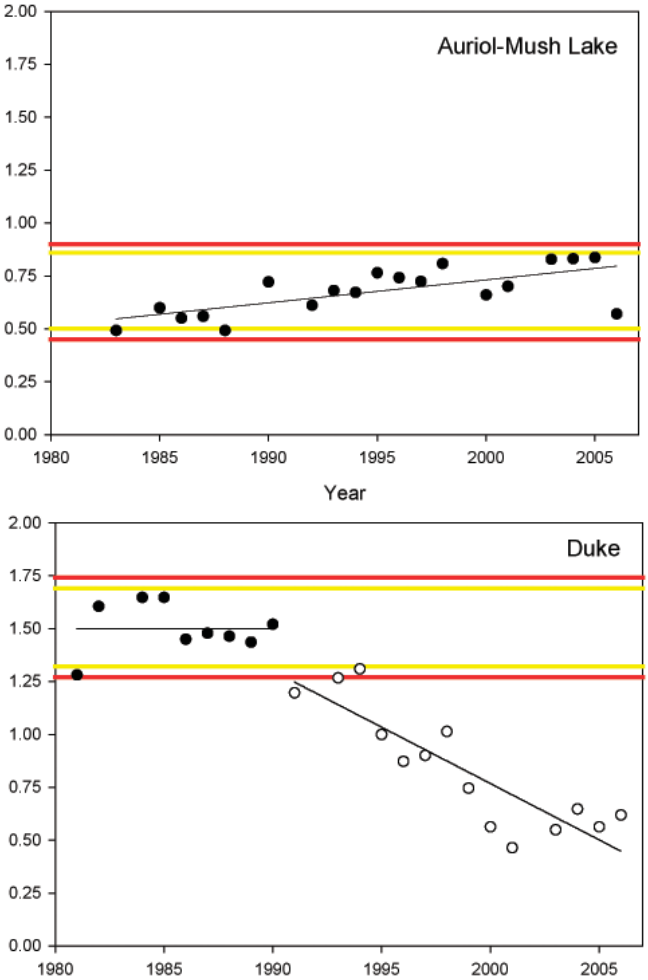
Relevance: Moose is the primary large ungulate in KNP&R's forests. Moose are important prey for large carnivores, including wolves and grizzly bears. The population of moose within the park is linked to that in the greater park ecosystem. It is also a species of special cultural interest to First Nations. Moose are found throughout the park's green belt, and are assessed through aerial surveys in the Auriol/Mush Lake and Duke River survey areas.

Thresholds: Management thresholds are based on the extent of change from densities at the start of sampling in the early 1980s. For Auriol/Mush Lake, the entire range of data was used to set management thresholds. The lower and upper green-to-yellow thresholds were set at 0.50 and 0.86 moose per km^2 while the lower and upper, yellow-to-red thresholds were set at 0.45 and 0.90 moose per km^2 (Lee and Sykes 2008). Duke River did not exhibit any significant changes from 1981 to 1990. Based on this time period, the lower and upper green-to-yellow thresholds were set at 1.32 and 1.69 moose per km^2 while the lower and upper threshold for the yellow and red thresholds were set at 1.27 and 1.74 moose per km^2 (Lee and Sykes 2008). Both sets of thresholds represent 90% confidence interval (1.6x standard deviation) for the green-to-yellow threshold and 95% confidence interval (2.0x standard deviation) for the yellow-to-red threshold (Krebs and Henry 2006). The minimum detectable trend over five years for total densities of moose was ±5.1 % at Auriol/Mush Lake and ±4.8 % at Duke River.

Assessment: The overall status for moose is yellow with a declining trend. It is based on amalgamating the different status and trends of the two herds. The total density of moose (males, females and young of the year) in the Auriol/Mush Lake area has been increasing since 1983 (Figure 6); however, its density is still within the thresholds. In contrast, densities of moose around the Duke River are declining (Figure 6a and b). Since 1990, total densities have dropped to 66.7% from those seen in the mid-1980s. The consistent declining trend and its current status is below the red threshold.

Figure 6a and b. Densities of moose, Auriol/Mush Lake and Duke River areas, 1980–2006

Black data points indicate periods of no significant change; white data points indicate periods of significant change; black lines represent the average trend over the time period



5.4.2.2 Spruce bark beetle (Stressor)

Relevance: The spruce bark beetle is believed to be native to the southwest Yukon and to central and southern Alaska. In the Kluane region, evidence suggests that beetle outbreaks were infrequent and limited during past centuries (Berg and Henry 2003). Changes began to occur in the twentieth century. The first large beetle outbreak occurred between 1934 and 1942 on the east side of Dezadeash Lake and extended from Klukshu to Champagne. An even larger outbreak, which started in the early 1990s, is still occurring (Berg et al. 2006). It is estimated that the beetles have affected mature white spruce trees throughout 350,000 ha in the greater Kluane ecosystem (Garbutt, Hawkes and Allen 2006). It is important to monitor the spread and impact of the current outbreak due to its scale and unprecedented nature.

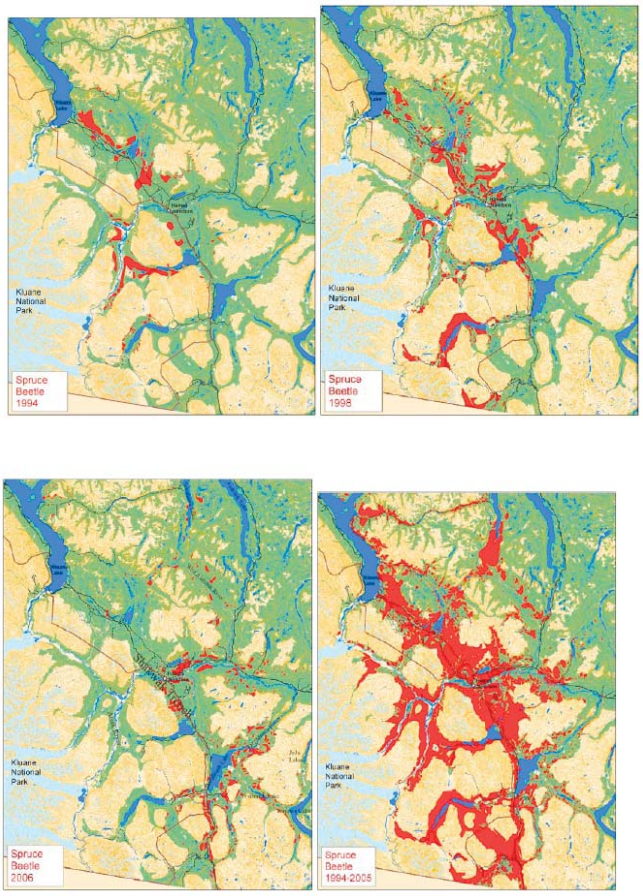
Thresholds: Not yet established.

Assessment: Beginning in the early 1990s spruce bark beetle populations reached epidemic levels within the Alsek River drainage (Figure 7). By 2005 between 80 and 90% of the trees in the Alsek drainage had been killed by the spruce bark beetle and other associated forest insects (such as the Ips beetle).

Spruce bark beetle broods were unusually successful for two main reasons: 1) high brood survival as a result of unusually mild winters, and 2) a relatively high incidence of one-year cycling (spruce beetles normally require two years to complete their life cycle). As a result, beetle populations increased up to tenfold in a single generation (Garbutt 2006).

Between 2000 and 2002, forest assessment plots were established in the park within infested stands in the Kaskawulsh and Alsek valleys and at Mush Lake (Garbutt, Hawkes and Allen 2006). Early data suggest that, on average, there are enough young spruce and aspen for natural forest regeneration. With the loss of overstorey trees, the understorey will be able to grow and form the succeeding stand. In the next 30 to 40 years, as the dead overstorey falls, uniform young stands could cover the landscape. The percentage of aspen growing in these forest stands may increase.

Figure 7a–d. Area of outbreak, spruce bark beetle



Source: Garbutt, Hawkes and Allen 2006

The forest floor will be littered with dead stems for the better part of a century, however; at least initially, this will increase the risk of ground forest fires and may impede the movement of wildlife (Garbutt, Hawkes and Allen 2006).

5.4.2.3 Snowshoe hare (Biodiversity)

Relevance: This species is the keystone herbivore[15] in the park's boreal forest ecosystem (Krebs, Boutin and Boonstra 2001). Across the boreal forest of North America, snowshoe hare exhibit a strong ten-year population cycle (Henry 2002). In the Kluane region, population changes in

15. "Keystone species are species that enrich ecosystem function in a unique and significant manner through their activities, and the effect is disproportionate to their numerical abundance. Their removal initiates changes in ecosystem structure and often loss of diversity" (National Wildlife Federation 2006, p.1).

hares are the main driver of population changes in predators (e.g., lynx, coyote, red fox), other herbivores (e.g., grouse, arctic ground squirrel, Dall's sheep lambs) and herbs, shrubs and young trees (Krebs et al. 1995; Krebs, Boutin and Boonstra 2001; Wilmshurst, Greer and Henry 2006). By weight, snowshoe hares provide 45% of the mammals that many predators hunt and depend upon. Snowshoe hares have been monitored in the Kluane region since 1976 (Krebs, Boutin and Boonstra 2001).

Thresholds: Because of its cyclical population, a six-year running average for snowshoe hare is used to calculate thresholds (see Krebs and Henry 2006). As shown in Figure 9, the green-to-yellow thresholds are 0.20 and 0.90 hares per ha. The yellow-to-red thresholds are 0.12 and 0.98 hares per ha.

Assessment: The last two hare cycles have lasted nine and eight years between peaks (Figure 8), which is short compared to other documented hare cycles (Krebs, Boutin and Boonstra 2001). Hare abundance at the peak of the cycle has declined during the last two cycles (Figure 8). Although these changes are not statistically significant, they are worth noting.

Figure 8. Snowshoe hare: density per ha, 1976–2007

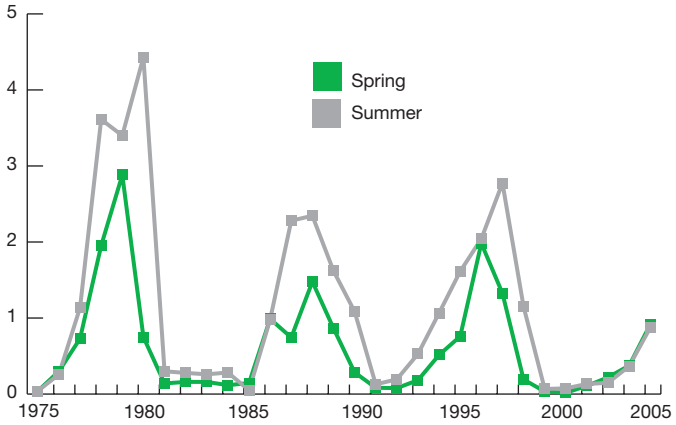
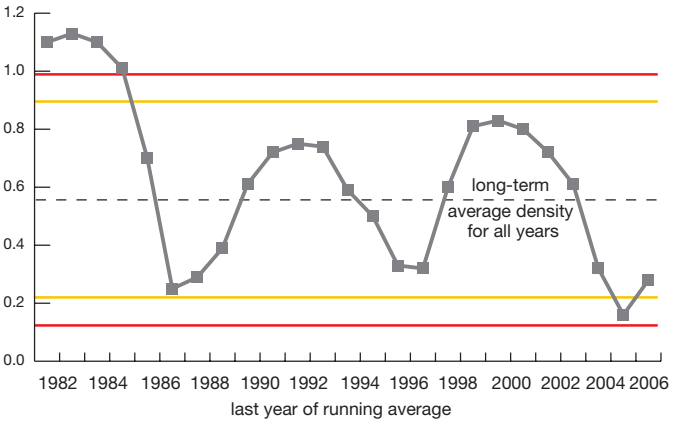


Figure 9 shows 1) the long-term average density of the population, 2) thresholds, and 3) the six-year running average density of the population from 1976 to 2006. Figure 9 also shows that the six-year running average for snowshoe hares was significantly higher from 1982 to 1985. In spite of the decline in the average after 1985, the six-year running average has largely stayed within the green zone since 1986. This snowshoe hare population is judged to be healthy because it has shown a consistent amount of population variation from 1986 to 2006. Its status is green and it shows a stable trend.

Figure 9. Snowshoe hare: six-year running average for density per hectare, 1982–2006



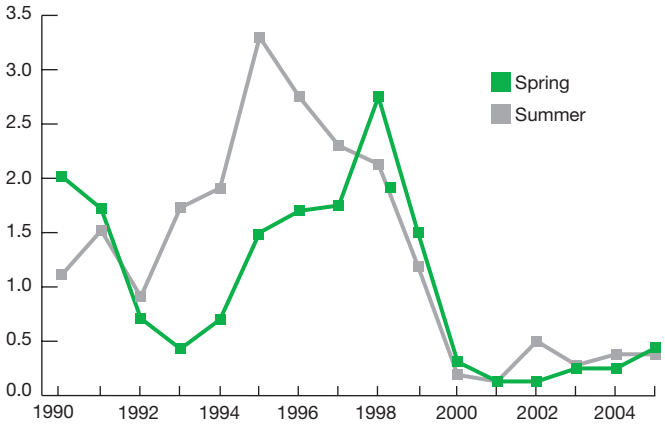
5.4.2.4 Arctic ground squirrel (Biodiversity)

Relevance: This small herbivore has numerous inter-relationships with other species and is of particular importance to the local First Nations. By weight, arctic ground squirrels provide 16% of the mammals that many predators hunt and depend upon.

Thresholds: Because of its highly cyclical population, a six-year running average density for arctic ground squirrels (Figure 11) is used to calculate thresholds (Krebs and Henry 2006).

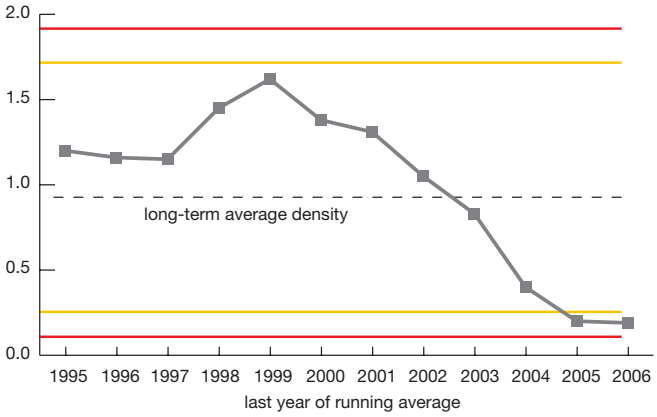
Assessment: Although arctic ground squirrel populations typically fluctuate in a pattern that parallels snowshoe hare populations (Krebs, Boutin and Boonstra 2001), similarities between these two populations have decreased in recent years. A significant decrease in the arctic ground squirrel population began during 2000 and the population has remained low through 2006. Its six-year running average (Figure 11) was 1.36 squirrels per ha for a period ending in 2001 and dropped below 0.3 squirrels per ha for a five-year period ending in 2006.

Figure 10. Arctic ground squirrel: density per ha, 1990–2006



The running average density passed into the yellow zone in 2005. At the present time the status of the arctic ground squirrel population in the region is yellow and shows a declining trend. Although the causes for this decline are not yet known, the lack of insulating snow cover during parts of recent winters, and heavy rains — which can flood burrows and then freeze in late November or early December — are possible factors.

Figure 11. Arctic ground squirrel: six-year running average for density per hectare, 1995–2006



Traditional Knowledge:
Säl (Arctic ground squirrel)

Säl, known locally as gophers, are a very important species to local First Nations people. Säl are seen as an important healthful food source, and the skins are used in sewing traditional clothing. Much attention is paid to weather conditions, behaviours, food sources and condition of the animals to assess the health of säl in a given area or within a given season.

5.4.2.5 Red squirrel (Biodiversity)

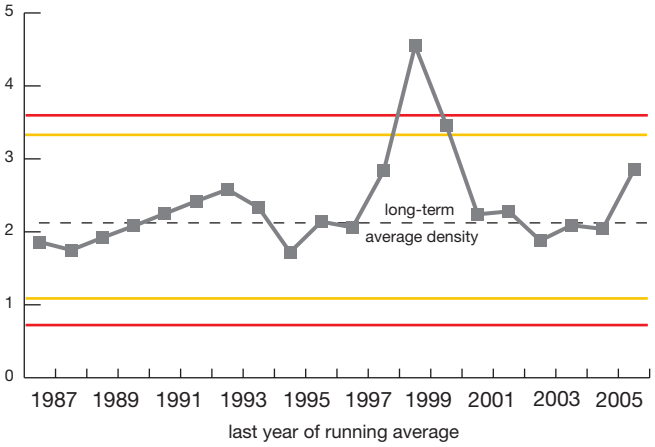
Relevance: The red squirrel is an important omnivore in the park's forests, interacting with many plants and occasionally preying on bird eggs, young birds or young hares. By weight, red squirrels provide 17% of the mammals that many predators hunt.

Thresholds: Because the red squirrel population shows only moderate variation over time, a one-year average for squirrel density can be used to monitor it (Krebs and Henry 2006). As shown in Figure 12, the green-to-yellow thresholds are calculated to be 1.05 and 3.37 squirrels per ha. The yellow-to-red thresholds are 0.75 and 3.69 squirrels per ha.

Assessment: Data collected from 1987 to 2006 in the Sulphur Lake study area adjacent to the park show that the long-term average density for red squirrels in this area is 2.2 squirrels per ha (Boutin unpublished data). From 2000 to 2004, the spruce bark beetle outbreak caused a gradual decline in the squirrel population, but it recovered (Figure 12), responding to a large crop of white spruce cones in 2005.

The monitored red squirrel population at Sulphur Lake has remained largely within the green zone since 1987 (Figure 12). This indicates that this red squirrel population is healthy and productive. The status of the red squirrel population in the Sulphur Lake area is green and shows a stable trend.

Figure 12. Red squirrel: density per hectare, Sulphur Lake study area, 1987–2006



5.4.2.6 Birds (Biodiversity)

Relevance: Birds comprise the greatest vertebrate diversity in the park. Nearly 200 bird species have been documented in KNP&R, approximately two thirds of which nest within the park. Because birds migrate long distances and are highly mobile, bird populations must be analyzed on a regional scale for trends to become apparent.

Thresholds: Not yet established.

Assessment: Each spring, park staff carry out a Breeding Bird Survey (BBS)[16] on two routes immediately adjacent to the park to help monitor bird populations.[17] The Canadian Wildlife Service has analyzed population trends for Yukon birds from 1994 to 2004 and has observed significant population declines in six bird species. During the same period, one species (Lincoln's sparrow) has shown a significant increase in population ($P < 0.01$) (Table 3). All the birds species listed in Table 3 are frequently observed in the park and form part of the more than 100 bird species that raise their young in the park. Annual population changes are shown in Table 3.

Table 3. Annual changes in seven bird populations

Species	decrease per year (%)	increase per year (%)
Mew gull[18]	11.6	
Western wood pewee[18]	10.5	
Yellow warbler	9.8	
Northern flicker	6.8	
White-crowned sparrow	4.2	
Dark-eyed junco	3.4	
Lincoln's sparrow		43.6

Although the two BBS routes are a small sample size, survey data from the park area show some of the characteristics as the regional trends given above.

Four bird species that occur or breed in the park are listed as Species at Risk: 1) The Peregrine falcon (Anatum) has recently been changed from Threatened to Special Concern in the federal *Species at Risk Act* (SARA); 2) The Short-eared owl is listed as a Species of Special Concern. It is scheduled to be reviewed by COSEWIC in the near future; 3) The Common nighthawk has recently been classified as Threatened by COSEWIC. The process to list it in SARA has been initiated; 4) The Rusty blackbird has recently been classified as a Species of Special Concern by COSEWIC, and is in the process of being listed in SARA. According to a recent inventory of Rusty blackbirds in KNP&R (Heakes and Henry 2008), several wetlands in the park support 10 to 15 nesting pairs of this species. These wetlands will be monitored in future years.

5.4.2.7 Small mammals and ground plants

Due to space limitations, the following two forest measures are presented in summary format. See Krebs and Henry 2006 for further details. (These two EI measures are given equal importance to the measures described above for calculating forest indicator state and trend.)

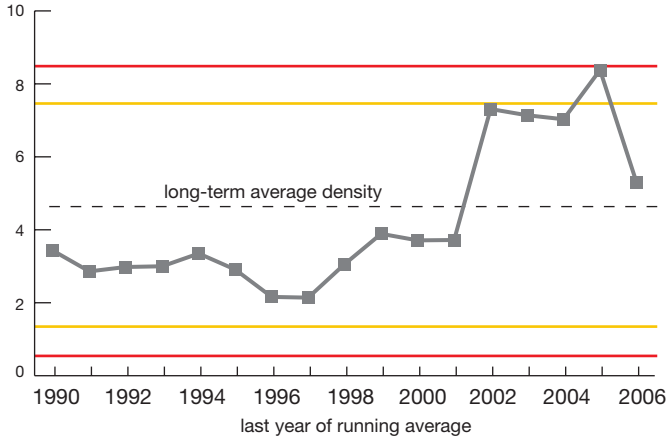
Mice and voles (Biodiversity)

These small burrowing mammals carry out important functions in the region's forests, dispersing seeds, aerating the soil, and serving as important prey for raptors (e.g., owls and hawks) and mammalian predators (e.g., weasels, martens, coyotes and foxes). For these reasons, the populations should continue to be monitored. Mouse and vole populations have been monitored in areas

16. These BBS routes are part of a North American-wide monitoring program. The bird trends described in this section are based on BBS data from 1994-2004. The significant level for the Yukon trends is $P<0.05$ and for the Northwest Interior Forest $P<0.01$. Sample size is more than 20 in each case.
17. The BBS route from Jarvis River to Quill Creek has been carried out since 1998 and the route from the Mush Lake road to Million Dollar Falls campground since 1999.
18. The decline for Mew gull and Western wood pewee is for an area termed the Northwest Interior Forest (a region that takes in northwestern B.C., Yukon, western NWT and interior Alaska).

adjacent to the park since 1973 (Krebs, Boutin and Boonstra 2001) and they show low site-to-site variation (8% spatial variation). Figure 13 shows the yellow and red thresholds. Using a four-year running average (Krebs and Henry 2006), mouse and vole populations have stayed largely within the green zone since 1987. However, Figure 13 shows that the four-year average density of these small mammals abruptly increased between 2002 and 2005, only returning to more normal densities in 2006. This increase might be caused by greater forest primary productivity due to climate change, or greater ground berry production due to the forest canopy being opened as a result of the outbreak of spruce bark beetle.

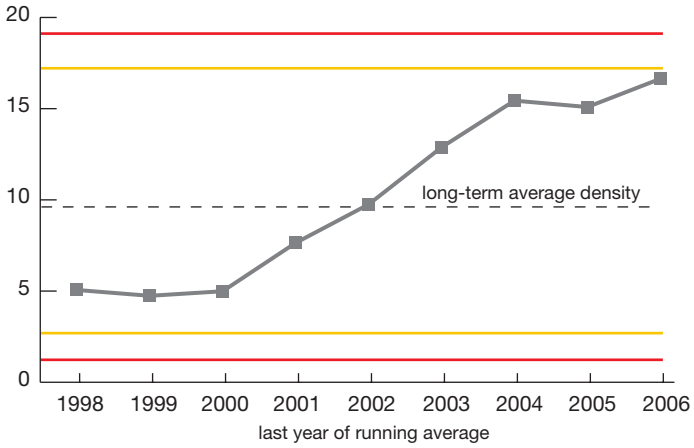
Figure 13. Four-year running average for density per hectare for mice and voles, 1990–2006



Bearberry (Ecosystem function)

Bearberry (also called kinnickinnick) provides important seasonal food for a number of species, including grouse, mice, voles and bears. Its berry crops are a measure of the health and productivity of the forest's herb layer. Berry production varies from site to site (23% spatial variance), but year-to-year patterns (55% temporal variance) are twice as pronounced (Krebs and Henry 2006). Figure 14 shows the yellow and red thresholds. Using a four-year running average, an index of the bearberry crops has stayed within the green zone since 1998. However, its overall trend is increasing. The running average of the mean number of berries per quadrat has steadily increased since 1995 and may soon cross into the upper yellow zone. This increased berry production might be a response to the forest canopy being opened as a result of mature spruce trees dying from the spruce bark beetle outbreak, or might be related to Kluane's changing climate.

Figure 14. Four-year running average of berry production for bearberry on permanent quadrats, 1998–2006



5.4.3 Tundra

Alpine tundra[19] and its associated shrublands have moderate vertebrate biodiversity and high plant biodiversity. In the park, tundra generally starts at elevations between 900 and 1100 metres.[20]

5.4.3.1 Dall's sheep (Biodiversity)

Relevance: KNP&R has one of the largest concentrations of Dall's sheep in the world. They are the most abundant large mammal in the park, which provides key habitat for their regional survival and reproduction. Dall's sheep are found throughout the alpine areas of the park and are monitored in four areas: Auriol, Donjek, Tachàl Dhãl and Vulcan Ranges. Their numbers have been tracked through aerial surveys since the mid-seventies (Figure

19. In this report, tundra refers to the areas above treeline that are mostly vegetated.

20. Alpine tundra and grassy areas cover 4.4% of the park. Shrublands, the transition from tundra to forests, cover 6.2% of the park (Sundbo 2002). Sixty percent of the shrublands has been assigned to the tundra ecosystem (based on expert staff opinion), resulting in tundra covering 8.3% of the park.

15). Human activity may have a negative impact on the Dall's sheep population.

Thresholds: Thresholds are based on a significant change from densities at the start of sampling in the mid-1970s. Neither the Tachàl Dhäl nor Vulcan Range herds exhibited any significant changes from 1976 to 2005. For these herds, thresholds were based on the whole sampling period (Lee and Sykes 2008). The Auriol and Donjek herds have shown changes in densities in recent years. The thresholds for these herds were based on data from 1975 to 1984 and 1976 to 1990, respectively (Figure 15, Lee and Sykes 2008). The minimum detectable trend for the total density of sheep varied from ±5.6 (Tachàl Dhäl) to ±9.1% (Vulcan Range) over five years.

Assessment: The overall ranking of yellow is based on the red status of the Auriol herd and the green status of all other herds. The last survey in 2004 indicated that the Auriol Range had less than 0.35 animals per km^2, a 64% decline from a mean baseline of 0.94 animals per km^2 20 years earlier. The Auriol Range also has the lowest density and absolute numbers (109 animals in 2004) of all the areas. Furthermore, based on the results of the last three surveys the trend is likely to continue (Figure 15). The densities of rams and animals within the nursery (juvenile males and females, and adult females) have also declined while the density for the young of the year has not. From 1976 to 1990 the Donjek Range herd increased from its baseline levels by more than 20%, from 3.3 animals per ha to 4.0 animals per ha in 2006 (Figure 15). However, it is still within the green zone of the thresholds. The Donjek Range herd has also seen an increase in the density of rams and young of the year, although the density of animals within the nursery has not increased. Both the Tachàl Dhäl and Vulcan herds are within the green zone of the thresholds (Figure 15).

5.4.3.2 Mountain goats (Biodiversity)

Relevance: Mountain goats live in the park's alpine areas. Goatherd Mountain and the east side of the Alsek River are productive alpine habitats with ample forage and protection. Although mountain goats do not easily fall prey to natural predators, they may be affected by human influence.

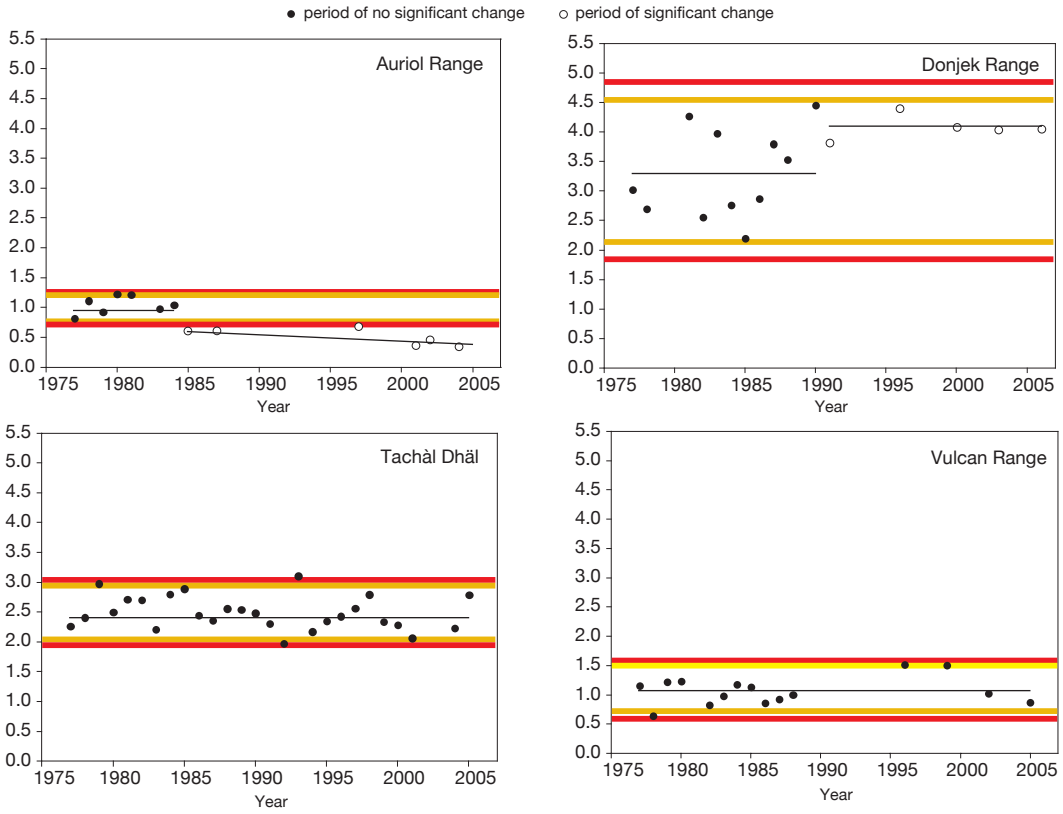


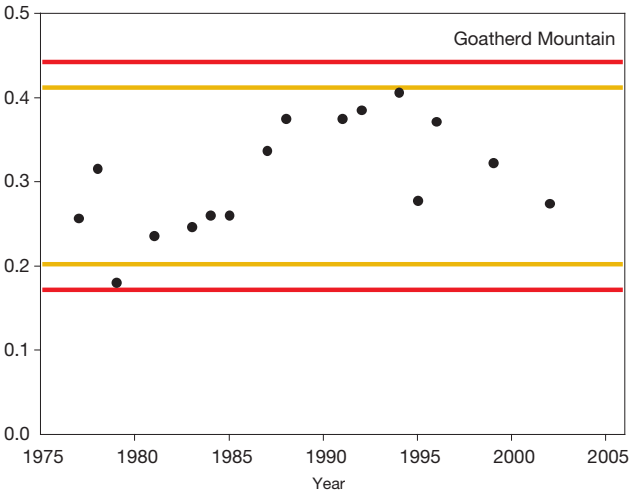
Figure 15 a–d. Dall's sheep: density from aerial surveys of the Auriol, Donjek, Tachàl Dhäl (Sheep Mountain) and Vulcan ranges, 1976–2005

The Goatherd Mountain population is an indicator of other mountain goat populations in the park; it has been surveyed since 1977 using aerial counts (Dehn 2003).

Thresholds: No overall trends were detected in the dataset (1977–2002). Thresholds were based on the entire range of data. Upper boundaries were set at 0.41 (green-to-yellow, average + 1.6x standard deviation) and 0.44 (yellow-to-red, average + 2.0x standard deviation) adult goats/km^2 (Lee and Sykes 2008). The lower boundaries are set at 0.20 (green-to-yellow, average –1.6x standard deviation) and 0.17 (yellow-to-red, average –2.0x standard deviation) adult goats/km^2 (Lee and Sykes 2008). The minimum detectable trend for adult density is ±8.7% over five years.

Assessment: Overall status is green with a stable trend. The average density of adult mountain goats from 1977 to 2002 was 0.31 ± 0.7 goats per km^2 (Figure 16).

Figure 16. Adult mountain goats: densities from aerial surveys of the Goatherd Mountain herd, 1977–2002



5.4.3.3 Grizzly bears (Biodiversity)

Relevance: Kluane's grizzly population has been described as possibly one of the most genetically diverse populations in North America (McCann 2001). Considered an umbrella species and indicator species,[21] grizzly bears are an important gauge of EI. Large home ranges, low reproduction rates and sensitivity to human disturbance are all factors that emphasize the necessity for monitoring. The grizzly bear (northwestern population) is listed by COSEWIC as a species of Special Concern.

Thresholds: Not yet established. The 2004 park management plan (Parks Canada Agency 2004b) sets a target of human-caused grizzly bear mortality as destruction or removal from the population not exceeding one bear in any seven-year period.

Assessment: There is no formal monitoring process either within the park or in the greater ecosystem to allow for a current assessment of population trends or habitat quality. Grizzly bears usually only occupy the green belt of KNP&R, which is relatively small (approximately 4000 km^2). Estimated densities within the greenbelt range from 11 bears per 1,000 km^2 in the north end of the park to 40 bears per 1,000 km^2 in the southern regions of the park. There has been no rigorous, scientifically-based population estimate for KNP&R. Most estimates are based on expert opinion or rough counts of bears. Estimates from these exercises range from 64 to 302 bears in the park, indicating substantial uncertainty about the population size.

Research conducted by McCann (2001) suggested a negative population growth rate of 3%, which may indicate a declining population. Mortality data from neighbouring jurisdictions suggest that high rates of human-caused mortality may be influencing the region's population dynamics. Human-caused mortality in the Kluane region from 1983 to 2003 met or exceeded the rate recommended by the Yukon government (Pearson 1975; McCann 2001; and Maraj 2007). KNP&R's grizzly population exhibits a late age of first reproduction (eight years), and has small litters (an average of slightly less that two cubs per litter) and a very high natural mortality of newborn cubs (>50%) (McCann 1998). A significant proportion of the park's population requires access to neighbouring lands to meet their habitat requirements. Highways, human

21. "...umbrella species are typically large and require a lot of habitat. By protecting this larger area, other species are protected as well." An indicator species is one "that is particularly sensitive to environmental conditions and therefore can give early warning signals about ecosystem health" (National Wildlife Federation 2006, p.1).

habitation and various other infrastructure border the park. Harvest of bears is legal outside the park and currently there is no harvest quota for bears.

Human/bear interactions within the park have been monitored since the early 1980s. Recent analysis of these interactions suggests that management actions (e.g., bear-resistant food storage requirements, designated campsites and restrictions on human use, travel and camping) in some parts of the park have reduced negative interactions (see Chapter 10, Table 6).

While thresholds have not been set, the potential population decline (McCann 2001), high human-caused mortality outside the park (Maraj 2007; McCann 2001; Pearson 1975) and lack of a monitoring protocol have led to uncertainty about the population status of grizzly bears. Park managers by consensus have assigned a yellow rating to this population.

Traditional Knowledge: Grizzly (Shär sho)

Grizzly bears are very important in a cultural/spiritual context as well as for the role they play in the region's ecology. Many traditional rules governed how an individual was to behave respectfully when living in bear country. Traditional management practices included avoiding salmon streams at the times of day when bears were known to feed. Elders also recognize the importance of stable bear populations, knowing that it was the older dominant bears who minimized human-bear interactions by keeping the young adolescent bears in line. Some Elders have expressed concern that bears in the park have lost their fear of humans, and that this has affected their behaviour.

5.4.3.4 Recreational use (Stressor)

Note: Although listed here under the Tundra ecosystem (5.4.3), recreational users are found in all the park's ecosystems and often traverse several ecosystems on a single trip.

Relevance: The 2004 KNP&R management plan (Parks Canada Agency 2004b) identified impacts of recreational use at the park level (backcountry use, such as wildlife interactions and disturbance and trail and campsite impacts, as well as aircraft landings and flightseeing, fishing) and at the regional level (hunting). An assessment of cumulative effects (Slocombe, Danby and Lenton 2002) evaluated the impact of recreational use on the park. It indicated that many of the management tools recommended by the 2004 park management plan (e.g., use limits, education, closures, designated campsites) had reduced or eliminated some of the previous concerns, but indicated that monitoring of recreational use should continue. Recreational use was reviewed with respect to potential impacts on mountain goats, Dall's sheep, moose and golden eagles. The report's conclusion was that, "while there may not be many major individual activity effects…the conjunction of several activities such as day-use and backcountry hiking and camping and flightseeing, together with the effects of hunting and road kills outside the park, probably are near critical thresholds for grizzly bear" (Slocombe, Danby and Lenton 2002, p. 110).

Thresholds: Not yet established. The USDA Forest Service (1990), Gibeau et al. (1996) and Gibeau (1998) have identified cumulative effects thresholds for high-intensity human use, ranging from 80 to 100 people per month. Current use levels within KNP&R are below this threshold, although use levels in the Ä'äy Chù (Slims River) Valley sometimes approach these values.[22]

Assessment: Overnight recreational use of KNP&R has decreased significantly (20 to 40+%) over the last ten years. It currently averages 985 visitors per year. Many factors have contributed to the drop in backcountry use (including the attacks of September 11, 2001, large forest fires, construction on the Alaska Highway and trail closures for fire and/or bear safety). The drop reflects a national trend.

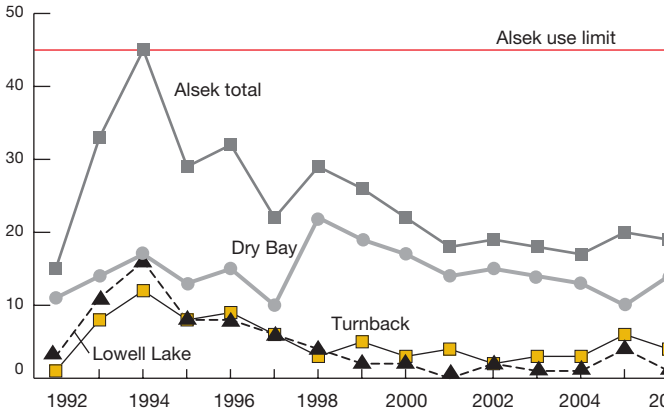
The use of trail counters on the park's most popular trails, and of commercial day-use trip reports, have made estimates of the number of day-use visitors more

22. A 2003 KN&PR workshop on grizzly bears provided the information that it was not the number of visitors on the landscape as much as where, when and how recreational users used the landscape (for example, using critical habitats at sensitive times of the day or year), and the specific ecological objectives for the landscape that was important (i.e., critical Dall's Sheep lambing area; critical security habitat for female grizzly bears with cubs; critical winter habitat for moose).

accurate. The number of recreational day-use visitors in KNP&R is estimated at 6,500 to 7,500 per year, more than double the estimate in the 2004 park management plan.[23] Commercial use (day and overnight) accounts for 20 to 30% of the recreational users in Kluane.

The number of visitors using the Alsek River is lower than in the mid-1990s (Figure 17). The current ecological and wilderness-character threshold allows one departure every other day; use levels during the peak season are well below the maximum 45-trip capacity.

Figure 17. Total number of raft trips (to Dry Bay, Turnback, Lowell Lake) on the Alsek River, 1992–2006



A range of research and monitoring work on recreational use has been undertaken in KNP&R since the 1990s. It includes ongoing monitoring and assessment of recreational use levels, surveys on visitor satisfaction and wilderness use, studies of backcountry recreational use impacts, assessments of bear-hiker/rafter risks, and statistical investigation and analysis of bear-hiker/rafter interactions. The research findings and recommendations from these studies have led to the implementation of several management actions, including enhanced pre-trip and on-site trip planning information programs, closures of high-risk backcountry campsites, mandatory use of lower-risk designated campsites, mandatory use of bear-proof food canisters, and limits on and closures of hiking routes. These actions have proved effective in reducing recreational use impacts on the park's EI (see Chapter 10, Table 6 for examples).

While thresholds have not yet been established, a green rating is based on demonstrated success of the management actions listed in the previous paragraph in conjunction with decreasing backcountry use.

5.4.4 Freshwater[24]

5.4.4.1 Dezadeash water quality (Ecosystem function)

Relevance: The Dezadeash River, one of the few rivers in KNP&R with its headwaters outside the park, is one of the park's major water sources (Mackenzie-Grieve 2004). It provides habitat for fish, invertebrates and aquatic plants. It is also popular for recreational use; visitors come from all over the world to raft the Dezadeash/Alsek rivers.

Thresholds: The Freshwater Quality Index (Water Quality Index) is a compilation of data over a three-year period. The index is based on variables that characterize a particular site or that may be of concern. It allows experts to synthesize large amounts of complex water-quality data into a simple overall rating for a given site and time period. The index monitors the number of water quality variables that do not meet guidelines, and reports how frequently this occurs, and how much each guideline is exceeded. It then ranks water bodies as excellent, good, fair, marginal or poor, according to their overall suitability to support aquatic life.

Assessment: Dezadeash River water-quality monitoring is part of the Pacific and Yukon Region Water-Quality Monitoring Program, which is administered in partnership with Environment Canada. Water from the Dezadeash River has been sampled twice monthly for the past 13 years; the sampling assesses the suitability of water for aquatic life, such as fish, invertebrates and aquatic plants. These organisms require a high quality of water, which must be protected from human causes of water pollution, including waste discharges and land use.

23. An individual may be counted more than once if he or she hikes more than one trail.

24. 0.7% of the park is covered by open water and includes creeks, rivers and lakes. Gravel and alluvium habitat are closely associated with these water bodies, covering an additional 2.3% of the park, for a total of 3% (Sundbo 2002).

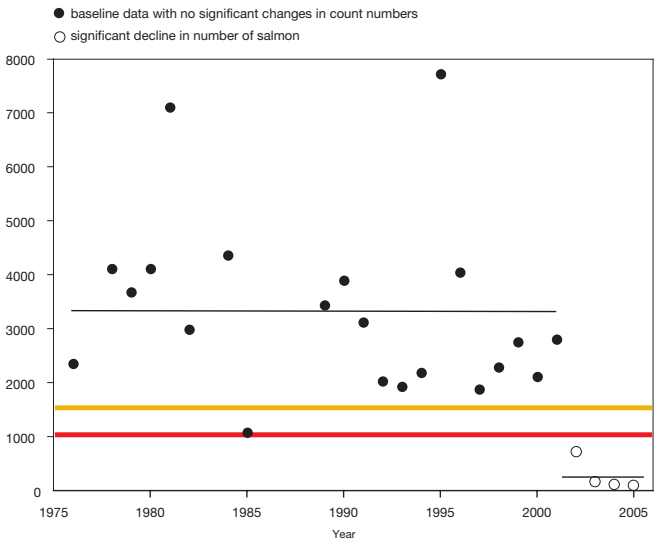
The water quality index from 2002–2004 rated Dezadeash as 83.8 or "good." A "good" ranking (80–94) indicates that measurements rarely exceed water quality guidelines and, that when they do, it is usually only by a narrow margin. These results suggest that, in this section of the Dezadeash River, aquatic life is protected with only a minor degree of threat or impairment. Based on this information, the status of the Dezadeash is green with a stable trend.

5.4.4.2 Kokanee salmon (Biodiversity)

Relevance: Since the park's inception, the kokanee salmon population has been recognized as an important component of the Kathleen watershed aquatic ecosystem (Wickstrom 1977). It is the only known population of naturally occurring kokanee salmon in Canada's national park system (Wickstrom 1978). It is believed to have derived from a population of sockeye salmon that once came up the Alsek River to spawning beds in the Kathleen Lake watershed. The status and trends of this population are based on surveys of spawning salmon at Gauging Flat and Chute, Spawning Flats (upper and lower reaches), Basin I, II, III, IV and lakeshore sites (Figure 18).

Figure 18. Number of kokanee salmon, 1975–2005

Based on walking surveys of Gauging Flat and Chute, Spawning Flats (upper and lower reaches), Basin I, II, III, IV, and lakeshore surveys.



Thresholds: Based on consultations with First Nations and community stakeholders, the threshold for green-to-yellow is 1,500 spawning fish while the yellow-to-red is 1,000 spawning fish. The minimum detectable trend after the crash is ±961.5% per five years. This is largely due to the extremely low numbers of fish, the high year-to-year variability of the population relative to current counts, and inadequacy of this sampling method for the current small numbers of fish. Previous to the crash, the minimum detectable trend was ±19.2% per five years.

Assessment: The overall ranking of kokanee salmon is red. This follows a crash in the spawning fish counts in 2002. From 1976 to 2001, the long-term average for counts was 3,337 (± 1,631 SD). Since 2002, the counts have remained at much lower densities with a mean count of 249 (± 322 SD). Only 61 fish were counted in 2005. The declines in the number of fish returning to the spawning beds have raised concern. Sport fishing for kokanee salmon is now prohibited within KNP&R. A number of hypotheses have been investigated in a preliminary manner to understand the causes of and possible mitigation measures for this population decline (see De Graf 2005). Tests found the fish to be relatively free of diseases and parasites. Recent analysis of past and present August water temperature of the Sockeye Creek spawning beds suggests that Kluane's changing climate may be warming water temperatures beyond the optimal range for kokanee reproduction (Morbey 2005). Further research is needed into this preliminary hypothesis.

5.4.5 Wetlands

Due to KNP&R's mountainous terrain and low levels of precipitation, wetlands (bogs, fens and swamps) are scarce in the park, covering only 0.2% of the park area (Sundbo 2002). They do, however, support plant communities and animal populations that are characteristic of wetland habitats. The NDVI productivity protocol and measurements of several forest monitoring measures (e.g., breeding birds, moose) are partially carried out within wetlands and are discussed above. Presently, no EI measures are monitored exclusively in park wetlands.

5.5 Cultural Reintegration

Although cultural reintroduction is not part of the northern bioregional EI indicators, it is recognized as a key component of the park's EI and has been assessed in a qualitative manner with First Nations partners.

For thousands of years the Southern Tutchone people have been an integral part of the greater Kluane ecosystem. The traditional knowledge arising from this long-established relationship to the land contributes to the park's ecological integrity. Recognizing this, a goal within the EI section of the 2004 park management plan states: "The aboriginal cultural landscape is recognized as an integral part of the Kluane regional ecosystem, and through the expression of Southern Tutchone traditional knowledge, is a significant contributor to ecosystem management" (Parks Canada Agency 2004b, p. 24).

Significant progress has been made in recent years towards the strategic goal of cultural reintegration. The need for cultural reintegration dates back to 1942, when First Nations people were removed from the area that became parklands. Since then, Parks Canada's understanding of First Nations' longstanding relationship to the land has led it to adopt an approach of inclusion rather than exclusion. Through "Healing Broken Connections" (an ecological integrity pilot project funded by Parks Canada, CAFN and KFN), Southern Tutchone people are reconnecting with their traditional territory within the park. Together, Parks Canada and the First Nations are protecting traditional knowledge and creating relationships built on healing, trust and a shared commitment to cultural reintegration.

Table 4 (page 26) lists actions that have been initiated to advance cultural reintegration. Over time, reintegration will help maintain EI and enable the local First Nations to further contribute to park management.

Table 4. Actions to advance cultural reintegration

Actions initiated	Effect on cultural reintegration
Implementation of National Ecological Integrity Pilot Program "Healing Broken Connections: Traditional Knowledge and Regional Integration" First Nations Elders, youth, citizens, park staff learning together about First Nations' way of life, e.g., culture camps Returning First Nations people to park lands for purposes of cultural and ecological integrity	Reacquaints First Nations with their cultural heritage in the park Helps park staff and others understand how First Nations' traditional knowledge and ties to the land contribute to the maintenance of ecological integrity
Facilitating access to and use of park facilities by Elders and youth	Increases First Nations' access to the park to carry out traditional activities Acknowledges and respects First Nations cultural heritage in park management decisions
Construction of traditional structures	Achieves recognition that KNP&R is part of the Southern Tutchone cultural landscape and encourages ongoing activities in the park Transmittal of TK from Elders to others
KFN Economic Impacts and Benefits Study	Identifies culturally appropriate business opportunities for First Nations
Development of harvesting protocols to replace existing no-harvest zones	Encourages access to and harvesting of culturally significant species by First Nations
First Nations Place Names Project	Teaches First Nations and non-First Nations people about the history and significance of the land and places on the land
Establishment of trainee positions in resource conservation and heritage presentation	Permits the sharing of different worldviews and provides a way for park managers to gain insight to issues that affect decision-making Opportunities for First Nations employees to influence Parks Canada's corporate culture
Investigation of opportunities to work with First Nations to advance National Historic Site designations	Provides the opportunity for Elders and youth to share information about important places within the cultural landscapes of the park
Interpretive programming that reflects First Nations' stories	Involves First Nations in telling their stories about their lands that are now KNP&R Increases the variety of programs offered to visitors

6. State of Cultural Resources

6.1 Cultural Resources

The cultural resources of KNP&R encompass the history of human occupation and activity in the park from as early as 8,000 years ago to the present day, and reflect aboriginal life, mining, exploration, mountaineering and recent use.

A number of cultural resource specialists, from both Parks Canada and the neighbouring First Nations, were consulted in the preparation of this report. Data sources included site-specific evaluations derived from the recording and assessment of the archaeological sites in the park, baseline information from the 1997 State of the Parks Report (Canadian Heritage 1998), and a template adapted from the one used to evaluate cultural resources in national historic sites.

Both tangible and intangible resources were considered. Archaeological sites, and the collections of artifacts made from these sites, constitute tangible evidence of past land use in the park. Intangible cultural resources include oral history, place names, songs and stories, knowledge of place and the ecosystem. These resources comprise an integral part of the history of Southern Tutchone people whose traditional territories fall within the park. They are also valued because of the contribution they can make to park management.

While it is the First Nations who provide an understanding of the value of intangible cultural heritage and who identify the appropriate actions to preserve and enrich these resources, Parks Canada has a responsibility within the park to understand these values and respond appropriately and respectfully in all the actions it takes.

There are 253 formally recorded archaeological sites within KNP&R, reported through archaeological survey work undertaken since the establishment of the park. Only four sites have undergone extensive excavation. Resources captured as part of the archaeological cultural resource inventory include pre-contact habitation and resource processing sites, historic period brush hut camps, and historic mining cabins. Of particular importance are the pre-contact quarry and processing sites associated with the HooDoo Mountain obsidian deposits, used for thousands of years as a source of raw material for manufacture of stone tools, and the historic mining-related sites of Bullion City, scene of the 1903–04 Kluane Gold Rush.

High cache. Parks Canada/R. Chambers

Most assessment and monitoring have been conducted in conjunction with inventory surveys (1978–1999; see details in Chapter 11).

Archaeological collections from the park represent artifacts that have been recovered during survey and excavation, as well as incidental finds. To date, 15,800 specimens have been collected. It should be noted that Parks Canada has an in-situ management policy for archaeological resources in the park, and these collections of curated artifacts represent only a fraction of the resources managed in the park.

Approximately 120 historical objects, representing a small percentage of the park's cultural resources, have been collected from KNP&R and a selection of archaeological specimens and historic objects are on display in the two visitor centres and the warden service office.

A small amount of archival material has been collected that relates to the park's mountaineering history, but the content and storage requirements of this material, as well as the extent of personal diaries, log books and files which contain references to cultural resources in the park, have not been assessed.

Table 5 provides a summary of the status of the various categories of cultural resources found in and associated with KNP&R. A more complete analysis and assessment was completed by the field unit and park cultural resource management staff, CAFN, KFN and the Kluane National Park Management Board.

Table 5. Status of categories of cultural resources in KNP&R

Evaluation Criteria	Archaeo-logical sites	Archaeo-logical collections	Built heritage	Historic objects	Cemeteries and burials	Archival collections	Intangible cultural heritage *
Threats			not rated				
Condition			not rated				
Evaluation			not rated				not rated
Management practices and actions			not rated		not rated		
Overall rating			not rated				
Messages related to cultural resources	 Messages related to cultural resources have been delivered by the park, but have been developed in an ad hoc manner. A cultural resource value statement should be developed to help frame cultural resource messages. Audience evaluation: it is not clear what messages various audiences are receiving and understanding about cultural resources.						
Comments	The main threats to the resources are natural erosion, structural decay and wildfires	The archaeo-logical collection housed in Winnipeg is well maintained	No buildings recognized or classified by Federal Heritage Building Review Office	Approxi-mately 100 items	One burial site is reported by archaeo-logical inventory	The collection of archival material requires organization and manage-ment	The advanced age of Elders with personal knowledge of the park and reserve threatens the resource

* This category was listed as "Oral History" in 1997.
-Categories for this table derive from the *State of the Parks 1997 Report*.
-Arrows indicate a trend of improvement or decline in the state of the resource since 1997, the last time that a State of the Parks Report assessed the state of cultural resources in KNP&R (Canadian Heritage 1998).

6.2 Recent Cultural Resource Management Work

Since 1997 (when the last national State of the Parks Report[25] assessed the state of cultural resources in each park), several archaeological surveys have taken place, adding 100 archaeological sites to the cultural resource inventory. These surveys were carried out in the greenbelt region of the park and included assessments of cultural resources on the Alsek and Kaskawulsh rivers, Mush, Bates and Kathleen lakes areas, and HooDoo Mountain, augmenting work previously done in the Donjek Valley and elsewhere in the park. A number of isolated finds from the icefields may reveal interesting information about the region's human history. Reports have been completed on all inventory surveys, with a report still pending on two archaeological salvage excavation projects in the Donjek Valley.

In 1998, the storage of the collection of archaeological specimens housed in the Parks Canada Service Centre in Winnipeg (W&NSC), including the collection from KNP&R, was upgraded to meet the standard for long-term care storage and handling. In 2003, 824 specimens were selected for the Kluane Archaeological Reference Collection Information catalogue. The catalogue includes images of 271 of the artifacts and information generated from the archaeology database about each one. The selected items receive enhanced care for long-term preservation.

Since 2004, "Healing Broken Connections" has undertaken a number of activities including a traditional knowledge database development, ethno-historical research in the park, and renewal of local First Nations' ties to the land (5.5: Cultural Reintegration).

6.3 Assessment of Condition of Cultural Resources

The integrity of the park's in-situ cultural resources (i.e., archaeological sites and their associated artifacts and features), evaluated at the time the sites were recorded, gives an indication of the condition of the resources, and the threats affecting them. Sites were formally evaluated in terms of the integrity of the resources, impacts at the time of recording, and potential threats to the integrity of the resources. Of a sample of 171 sites recorded or revisited between 1993 and 1999, 22.8% were undisturbed, 30.5% were slightly disturbed sites, 28.7% were moderately disturbed sites and 18% were heavily disturbed or destroyed.

Existing impacts at the time of evaluation included erosion (through wind, water, and mechanical processes such as slumpage), fire, decay of structural elements and visitor use. Wind and water affected 35.0% of the sites at the time of evaluation, while mechanical erosion affected 20.5%. The combined effects of erosion were 55.5%.

Structural decay, primarily deterioration of wooden elements of cabins and brush-hut sites, was observed at 16.4% of the sites. Visitor use had affected only 8.2% of the sites in the sample, while fire had affected only 3.5% of the resources.

Projecting potential impacts suggests a somewhat different pattern. Erosion through wind and water was estimated to potentially affect (or continue to affect) 48.5% of the sites in the future, while slumpage was estimated to affect 23.4% of the resources; thus the combined effects of erosion were projected to affect 71.9% of the cultural resources in the future.

Structural decay is projected to affect 39.2%, while fire was estimated to be a hazard for 36.3% of the sites. This reflects the risk of fire in the old growth forests in which many sites are located, and the higher risk of fire due to insect kill.

Fire can affect not only exposed wooden elements such as standing brush huts or log buildings, but buried resources by burning through artifact-bearing layers down to mineral soil. Heat from fires can also affect artifacts. Secondary effects include increased erosion in burned areas, and disturbance of sites through blow-downs of standing dead trees.

25. This biennial national report is now called the State of Protected Heritage Areas Report.

CAFN Elder Kathy Birckel (in hat) shares her knowledge of the Mush Bates area with (l-r) researcher Sheila Quock, anthropologist Sheila Greer and Chief Diane Strand on a break from hunting Säl (arctic ground squirrels). CAFN photo.

The potential threat of impact through visitor use in the future was estimated at 38.0%, assuming an increasing trend of visitation to the park, and increasing pressure of visitor use on the locations of archaeological sites (campsites, trails, etc.).

The evaluations assessed the life expectancy of the sites, using criteria established for the national Threatened Sites Program. These criteria take into account multiple factors, including the integrity of site fabric, existing and potential pressures on the resources from natural agents such as erosion or forest fire, and cultural agents such as visitor use. A projection of the estimated lifespan of the sites examined indicated that by 2007 51% would suffer disturbance sufficient to seriously impair their integrity or be completely destroyed. Although this percentage is probably somewhat elevated, since it is based on observational judgement rather than empirical data, and the sites have not undergone a subsequent reassessment, it does suggest that the in-situ cultural resources of KNP&R are under threat.

Erosion — through wind, water, and mechanical processes like slumpage and continuing decay of organic structural elements — represents the greatest threat to the archaeological sites. Destruction by natural wildfires within KNP&R constitutes another significant threat. Visitor impact may not be as serious a threat as the numbers suggest, given that the number of visitors to the park in recent years has been lower than projected.

The archaeological collections in Winnipeg are in stable condition in good storage facilities (see 6.2: Recent cultural resource management work and Chapter 11: Condition of information base).

Intangible cultural resources are under severe stress in KNP&R. Loss of First Nation peoples' use of the park has resulted in a loss of traditional knowledge related to the park. While people practised active traditional lifestyles outside the park boundary, until recently first-hand knowledge of the park was limited to the few Elders old enough to remember the time before the game sanctuary / park, or information shared second-hand through stories.

6.4 Assessment of Management Practices for Cultural Resources

Provisions from Final Agreements signed with CAFN and KFN provide for a cooperative relationship between the First Nations and Parks Canada in the management of cultural resources.

The 2004 KNP&R management plan identifies a number of key actions related to cultural resources to be implemented by management. The park has focused on those that relate to the development of capacity and working relationships with First Nation partners, and enhancing understanding of Southern Tutchone relationships with the park.

There is no cultural resource management plan for the park, nor is there a scope of collections statement regarding the collection, handling, care, storage, study and use of moveable cultural resources and documentary heritage resources from the park. A statement of cultural resource values has not been drafted for the park; it is expected that this will be developed with the participation of First Nations, Elders and other constituents from the community.

A Cultural Resource Inventory Binder and GIS location data, on file at the park, provide basic data for management of the park's archaeological resources,

but no cultural resource management plan is in place. Monitoring schedules have been proposed for all recorded sites but no monitoring plan is in place.

The site records and the collection of archaeological artifacts curated at the W&NSC are well maintained and monitored. The assemblage of historical objects and archival material housed at the park is relatively small and does not receive the specialized care and attention it needs.

6.5 Assessment of Delivery of Cultural Resource Messages

Messages related to cultural resources have been delivered by park staff, but have been developed in an ad hoc fashion. It is not clear what messages various audiences are receiving and understanding about cultural resources. A cultural resource value statement would help frame the park's messages related to cultural resources.

7. State of Public Appreciation and Understanding

7.1 Introduction

Education is a key component of Parks Canada's integrated mandate and plays a fundamental role in maintaining the park's ecological integrity and in providing meaningful experiences to park visitors and users. Interpretation and outreach programs create an awareness and understanding of the natural and cultural values of KNP&R. Interpretation programs create a personal connection with those visiting the park while outreach education programs reach out to those in local and regional communities and can share the story of KNP&R throughout Canada.

Following reductions to interpretation and outreach programs in the 1990s (part of a nationwide federal government review), the park is now rebuilding its commitment to education. This chapter provides an overview of the park's current interpretation and outreach programming and an assessment of the programs, examining participation, understanding, satisfaction and active support. An internal assessment of the park's public education program was also conducted in 2006 to help inform this report (Appendix 2, Table 9).

7.2 In-park Interpretation

7.2.1 Interpretive facilities

The Kluane National Park and Tachäl Dhäl visitor centres are the two focal points for park interpretation and visitor contact. Visitors can learn about the park through exhibits, the audio-visual program, park brochures or interaction with staff through talks and presentations.The exhibits and audio-visual program in the Kluane National Park Visitor Centre in Haines Junction are outdated and do not reflect current park stories and messages (Aldrich Pears and Associates 2003). The park is currently in the design phase for the recapitalization of the Kluane Visitor Centre. Minor improvements are being made to the Tachäl Dhäl exhibits in the next few years to better reflect First Nations' stories and messages for the area.

Visitor orientation and interpretation signage were identified as outdated or non-existent at all of the park trailheads, highway pullouts and day-use areas. A project was initiated in 2003 to develop and install new or replacement signs at numerous locations inside and adjacent to the park. This project, which includes approximately 89 new interpretive and trailhead orientation signs, is due for completion in 2010. At the end of 2006, 19 new signs were completed and installed. CAFN and KFN are working in collaboration with Parks Canada on the design and content for all the signs. There are also three self-guided interpretive trails in the park (Dezadeash, Rock Glacier and Soldier's Summit). The interpretive signs along these trails have deteriorated and are no longer current. There are no plans to replace these signs.

7.2.2 Personal programs

Summer park interpretation is limited and efforts are being made to stabilize it after significant fluctuations over the past decade. Approximately four to seven interpretive programs are delivered each week over a nine-week season. Programs include guided walks, hikes and campfire programs.

Short interpretive talks are also given to an average of 200 Yukon students who visit the park each year. The challenge remains to develop and resource a formal on-site school program targeted to a variety of grade levels.

7.3 Outreach Education/Community Outreach

7.3.1 Outreach education

After virtually no outreach education programming during the 1990s, a commitment was made in 2004 to support a small outreach program. This required a reduction in summer programs. A classroom program was developed that links to the Grade 7 curriculum and recently a Grade 8 program has been introduced. Curriculum-linked educational resources that teachers can use in their classrooms are needed.

A variety of educational resources are available to students and others via the Parks Canada website and links. These include a 3-D tour of KNP&R, a lesson plan on kokanee salmon, articles on park management in a "Time for Nature" series and a "Tour Canada from Space" segment on KNP&R from Natural Resources Canada.

7.3.2 Community outreach

Local residents who live in the communities bordering the park (Haines Junction, Destruction Bay and Burwash) are a key park audience. They do not view themselves as park visitors, but park users, and they have different motivations and sensibilities related to the park. They do not consider the park a destination but a place right in their backyard. For some people it is a place to recreate for a few hours, a day or a week. For local First Nations people it may be a place they have only recently become comfortable with for practising traditional activities. Some local people choose to visit areas elsewhere in the region. In the long term, the actions of local people have the potential for much greater impact on the park — both positive and negative — than those of park visitors. The park would benefit from further learning and collaboration between locals and park staff. Education programs targeted at a local audience can improve awareness and communications in both directions. They can be opportunities for local people to engage and enjoy the park.

Parks Canada staff host or participate in a few local special events each summer — National Aboriginal Day, Canada Day and Parks Day — and in the last few years have had a presence at the local music festivals. Throughout the year a guest-speaker series, targeted primarily at local residents, is held largely in partnership with the Yukon Science Institute and the Arctic Institute. Annual park snowmobile trips and community open houses are hosted in partnership with the Kluane National Park Management Board, also targeted to the region's residents. Although these events are meaningful for a small group of locals, they have not drawn a large audience or a wide range of community members. The challenge remains to develop and fund new methods for engaging more local residents in park programs.

CAFN and KFN, together with KNP&R, have hosted culture camps in the park since 2004. These events bring together local First Nations youth, Elders, community members and Parks Canada staff for a week of learning and sharing on the land. These camps provide an opportunity for First Nations people to visit their traditional lands and for all participants to share the traditional and scientific knowledge of the area.

The cultural stories and traditions of the local First Nations people are an important element of KNP&R interpretation. In the last few years Parks Canada staff have collaborated with CAFN and KFN on the development of cultural themes and messages for a number of interpretive projects. This work has been reflected in the more inclusive content of park brochures, signs and the website. Cultural messages for the park still need to be established to guide interpretive programs and products.

7.4 Public Appreciation and Understanding Assessment

An internal assessment of public appreciation and understanding was undertaken using national targets (where they exist). The first such assessment for the park, it provides some useful information, but concerns about a lack of comprehensive data or data that does not encompass a broad range of visitors/users were raised, particularly data related to participation, understanding and active support. Future SOPRs should have more and broader data with which to work.

Campfire program. Parks Canada

7.4.1 Participation

Initial measures have been established for visitor and student outreach participation but measures are still needed to assess the participation of local community members in outreach programming and level of outreach participation via the Parks Canada website (for example, the kokanee salmon lesson plan).

7.4.1.1
Measure: percentage of national park visitors who participate in a learning experience related to natural or cultural heritage

Target: 50% (national target)

Basic messaging about park significance is provided through exhibits at the Haines Junction and Tachàl Dhāl visitor centres and through park brochures and literature. Enhanced messaging is provided through the audio-visual program, interpretive talks, special events, campfire talks and guided walks.

An average of 54,480 people[26] visit Kluane's two visitor centres each year. According to the 2005/06 survey of visitors, 87% of respondents[27] viewed exhibits and/or read park brochures and literature; this shows that a large proportion of visitors gets some level of basic messaging and orientation to park services.

Between 1996 and 2006 an average of 10,255 people per year viewed the Kluane audio-visual program. Approximately 30% of the visitors who come to the KNP&R Visitor Centre receive some form of enhanced messaging. In addition, approximately 785 visitors a year participate in personal programs through campfire talks, guided walks or hikes.

Accurate statistics have not been kept for the number of visitors who participated in interpretive talks or special events. More effective and consistent methods for tracking participation in interpretive events are required. However, the same 2005/06 visitor survey revealed that 23% of respondents participated in interpretive talks at the KNP&R Visitor Centre; 17% in interpretive talks at the Tachàl Dhāl Visitor Centre; 17% in special events; 9.5% in campfire talks; and 5% in guided walks.

Participation in interpretive media and programs is one measure of success. More in-depth evaluation is required to understand what visitors are learning from the park's interpretive programs and products to see if key park messages are being successfully communicated.

A target of 50% has been established nationally for visitor participation in a learning experience. To more precisely assess this measure, it will be necessary to define what constitutes a "learning experience."

7.4.1.2
Measure: percentage of Yukon students contacted through an educational learning experience

Target: 100% of all Grade 7 and/or Grade 8 students from Haines Junction, Destruction Bay and Burwash; 85% of all Grade 7 students in Whitehorse.

Park staff deliver a classroom program developed for Grade 7 students to approximately 245 students every winter in Haines Junction, Whitehorse, and Destruction Bay schools; 77% of the total Grade 7 students (who number approximately 319) in these target communities are contacted.[28]

26. This is a ten-year average (1996-2006) of the total number of people who visited the KNP&R Visitor Centre and the Tachàl Dhāl Visitor Centre. A significant number of these visitors go to both centres. Since the park does not have a gate or main point of entry the accurate number of total park visitors is unknown.
27. The survey participants were independent visitors who arrived for a visit in private vehicles (not on a bus). Visitors eligible to participate in the survey were those entering the park for the first time. "Entering the park" is defined as visiting KNP&R Visitor Centre, Tachàl Dhāl Visitor Centre and/or Kathleen Lake Day-Use Area. Excluded from the sample were visitors under 18 years of age, people arriving to conduct business (contractors) and Parks Canada staff. On average, 68% of visitors to the park's VRCs are independent travellers while 32% arrive in bus groups.
28. This (245) is the average number of students reached by a classroom program in the 2004/05 and 2005/06 school years. It represents 6% of the approximately 4,100 K–12 students in these communities.

7.4.2 Understanding

Only one measure (7.4.2.1) exists to assess understanding. More measures are required to gain insight into a broader range of visitors, and other audiences including students and local community members.

7.4.2.1
Measure: percentage of visitors who understand the significance of KNP&R

Target: 75% (national target)

The 2005/06 visitor survey (Parks Canada Agency 2006b)[29] indicates that 60% of visitors understand the significance of KNP&R as measured by their ability to correctly answer four or more of six knowledge statements. This is below the national target of 75%, although it is higher than the 27% indicated by the 2000 survey (Parks Canada Agency 2004a).

Responses to the questions related to knowledge of the significance of the park, in the 2005/06 visitor survey, revealed that in all but one instance (where results were essentially the same), participants taking part in Kluane's interpretive programs scored higher on the knowledge questions about the park than participants who did not participate. The highest scores were from visitors who took part in personal programs such as guided walks and campfire talks. Unfortunately, the small sample size and lack of statistical significance limits the confidence of this finding. However, survey respondents who watched Kluane's audio-visual program did have knowledge scores that were statistically significantly higher than those of non-participants (audio-visual program participants answered an average of four out of six questions correctly versus three out of six correct for non-participants). The effectiveness of Kluane's interpretive programs and products warrants further investigation.

Park Superintendant Don Marrin works with his team of First Nations youth to win at traditional hand games at a Tachàl Dhãl camp in 2005. CAFN photo.

7.4.3 Satisfaction

Most of the work in this area has been surveys of park visitors. Teachers involved in educational outreach programming also provide some informal feedback on satisfaction.

7.4.3.1
Measure: percentage of visitors satisfied with onsite and outreach programming

Target: 85% overall satisfied; 50% very satisfied (national target)

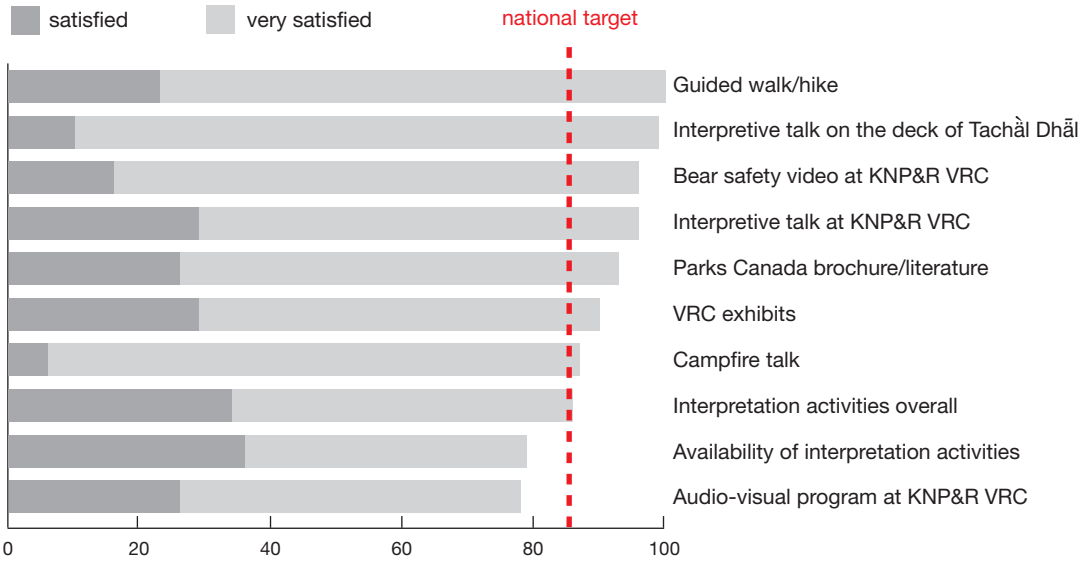
In the 2005/06 visitor survey, 86% of visitors who participated in an interpretive activity reported being satisfied (34%) or very satisfied (52%) with their interpretive experience; this exceeds the national target (Figure 19). As a learning experience, 86% reported being satisfied (34%) or very satisfied (52%) with the services and activities offered by KNP&R. Personal interpretive events received the highest satisfaction ratings: 89% of visitors were very satisfied with Tachàl Dhãl interpretive deck talks and 81% were very satisfied with campfire talks. The availability of interpretive programs scored below the national target, with 43% reporting themselves very satisfied. KNP&R's audio-visual program received the lowest overall ratings, with 26% of respondents satisfied and 52% very satisfied.[30]

29. This survey looks at independent visitors to the visitor centres and Kathleen Lake campground. Further work is required to learn the level of understanding of park significance of other park visitors, locals, and visitors traveling by bus.

30. Satisfaction with the audio-visual program was down 5% from a 2000 survey but exhibits and brochures/literature received higher ratings in 2005/06. All brochures had been updated in the period between the two surveys.

Figure 19. Level of visitor satisfaction with interpretive programs and products offered at KNP&R

Source: Parks Canada Agency 2006b



Visitors were also asked to rank the importance of various interpretive media, based not on their experience in the park but hypothetically (Figure 20). Visitors rated self-guided brochure-based trails (80%), self-guided sign-based tours (79%), and exhibits (79%) as the most important. As discussed earlier, exhibits and self-guided interpretive trails in Kluane require renewal and updating, particularly given the level of importance assigned to them by respondents. There are currently no self-guided brochure-based tours in KNP&R. Respondents rated guided hikes (longer than two hours) and children/family-oriented interpretive programs as the least important interpretive activities. The audio-visual program was deemed important or very important by 65% of survey respondents, and not at all important by 5%.

7.4.4 Active support

Current means of assessing active support gather information from visitors and stakeholders. Additional tools will be required to assess support of Canadians more generally.

7.4.4.1 Measure: Canadians, visitors and stakeholders actively support management actions to achieve or maintain the ecological health of KNP&R

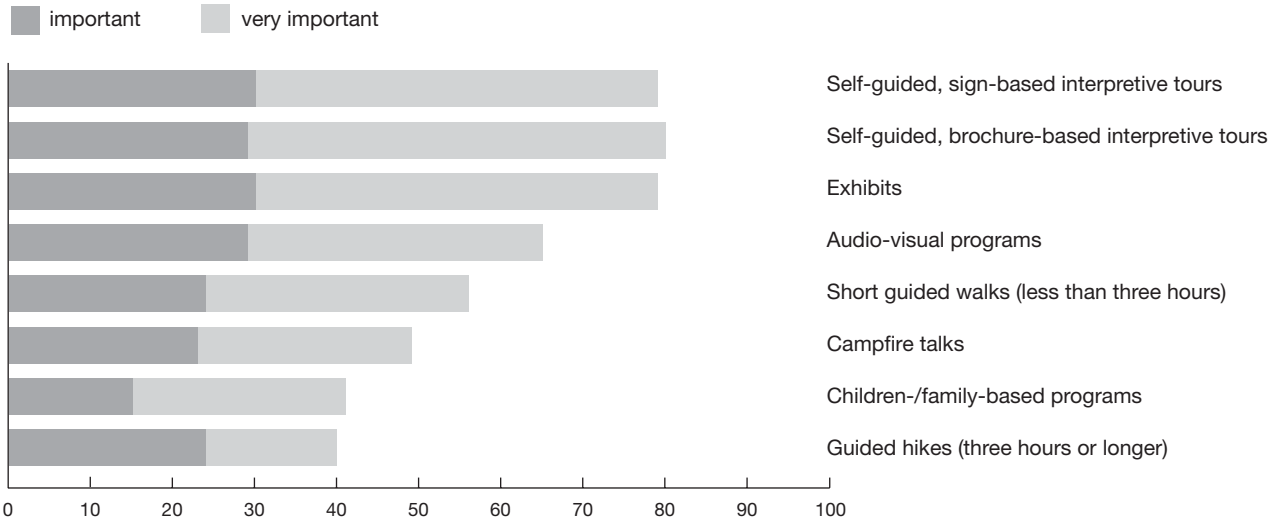
Target: Not yet established

A 2002 survey of park visitors (Haider and McCormick 2004)[31] asked them to rate the priority of five key initiatives identified in Kluane's park management plan that relate to achieving or maintaining the ecological heath of the park. Respondents identified protection of critical wildlife habitat (82%), working with others to maintain the ecosystem (75%), wilderness declaration, which involves protecting 95% of the park from development (80%), and increasing ecological monitoring (59%) as very high management plan priorities. Re-establishing First Nations' lost connection to the land was rated a much lower priority (26%). That indicates that park staff must improve awareness of the importance of this management action to the maintenance of KNP&R's ecological integrity.

31. Park visitors in this survey included backcountry rafters, hikers, and mountaineers, and short-stay day-use hikers encountered at trailheads and/or Kluane VRCs, as well as a small number of local residents (Haider and McCormick 2004).

The same survey found that local residents' support was 5 to 30% lower for the same initiatives. This suggests that more outreach and education is necessary. Interestingly, local respondents gave "expanding education, interpretation and outreach programs" a higher rating (54%) than did visitors (39%). Recent funding by the national office of a field unit ecological integrity education/outreach specialist position should assist in this effort.

Figure 20. Level of importance of various interpretive programs and products (hypothetical; not based on actual park services)



Source: Parks Canada Agency 2006b

8. State of visitor/user experience

8.1 Introduction

For more than 30 years, KNP&R has been valued as one of Canada's premier wilderness mountain parks, offering a range of high-quality visitor experiences including mountaineering, rafting, camping and backcountry hiking. People come from around the world to experience the park's wilderness character. More recently, visitor interests in the park have expanded to include more front-country day trips, First Nations' cultural heritage and winter experiences.

The park has three primary user groups: visitors (which includes a range of groups with specific interests), local users (local community members who do not consider themselves visitors) and First Nations people. Visitors and local users are discussed in this chapter. Use of the park by First Nations is discussed in 5.5 (cultural reintegration).

A variety of methods are used to better understand visitors, visitation, and satisfaction of their experience with the park. Surveys have revealed that encountering untouched nature, viewing wildlife in a natural setting, and experiencing solitude and natural quiet are important underlying motivations for people who visit the park. Wilderness surveys undertaken by SFU in 1996 (Dill, Jackson and Wright 1997) and 2002 (Haider and McCormick 2004) indicate that, to meet visitor expectations, Kluane's wilderness should be characterized by pristine views and backcountry campsites, opportunities to experience natural quiet, solitude, wildlife viewing and undisturbed ecosystems. As local First Nations reconnect with the park, efforts are underway to ensure that subsistence use and recreational use are compatible. Recreational use in the park is managed to protect and preserve the park's natural and cultural features, and the associated wilderness character that is the basis of memorable visitor experiences.

Guided interpretive hike on King's Throne trail.
Parks Canada/J. Butterill

Kluane National Park and Reserve continues to receive high scores on the services it provides; overall visitor satisfaction levels (96%) exceed Parks Canada's national satisfaction targets. Park visitation has been decreasing, however, and much of the park's visitor services and facilities require replacement or recapitalization.

8.2 Visitor Experience Assessment

Parks Canada conducts Visitor Information Program (VIP) surveys every five to six years to obtain information about visitors and to measure satisfaction and understanding. In KNP&R, these short surveys are complemented by more detailed surveys undertaken by Simon Fraser University's (SFU's) School of Resource and Environmental Management, which provide in-depth information on visitor motivations, willingness to pay, trip expenditure information, perceptions of environmental impacts, preferences for recreational management tools, and park management priorities. Visitor statistics are collected at the park's two VRCs, campground, on the trails through a network of trail counters, and through commercial operator trip reports. Formal and informal consultations with commercial operators, park visitors, local stakeholders, non-governmental organizations and inter-agency partners also provide information on visitor needs and interests. All this information is analyzed and used to guide park management decisions. The information gathered from these extensive and varied sources could be better utilized if it were consolidated, summarized and analyzed into specific areas so that park managers could retrieve it more effectively and efficiently.

New tools are being developed nationally within Parks Canada to allow for a systematic, objective measurement of performance in terms of visitor

experience. Visitor Experience (VE) assessments help parks and sites evaluate visitors' experiences. A VE assessment was completed for KNP&R with staff and partners in November 2006. The results of this assessment, as well as recent visitor studies (by Parks Canada, Yukon government and SFU) and staff expertise, contributed to the visitor experience assessment that follows. The charts at the end of each section are summaries of the 2006 VE assessment.

8.2.1 Understanding visitors/users

Through a better understanding of visitors and users — both actual and potential — Parks Canada will gain an understanding of their needs and expectations, such as why, how and when they visit and where they obtain information about the park. By better understanding its visitors and users, Parks Canada can remain relevant to Canadians by ensuring that its programs are responsive to changes in the tourism industry and in society. Continual improvement can be achieved by evaluating the effectiveness of management actions, learning from this process, and adapting programs accordingly. The three current measures are drawn from the VE assessment but may be modified in the future as a national VE performance measurement framework develops.

8.2.1.1 Measure: visitor/user markets (their motivations, needs and expectations) are clearly defined, prioritized and understood

Target: Not yet established

A 2002 park visitor survey by Simon Fraser University (Haider and McCormick 2004) revealed that for 44% of respondents KNP&R was their main destination; for 43% it was a planned stop on a longer trip; and for 13% it was a side trip taken while in the area. A 2005/06 survey of visitors (Parks Canada Agency 2006b) indicated that 39% of respondents were from Canada, 40% were from the U.S., and 20% were from overseas. This denoted a slight increase in overseas visitors and a slight decrease in U.S. visitors since 2000. It also revealed that most visitors to the park were on long haul trips; the average time away from home was 44 nights. On average, survey respondents indicated that they planned to spend 2.4 nights in and around the park; 25% planned to spend two nights and 33% one night. Park visitors are largely older (56% are older than 55), are visiting the park for the first time (70%), and are traveling in an average group size of 2.5 people. Their main park activities are vehicle-based sightseeing (68%), wildlife viewing and bird watching (60%), day hiking (53%) and camping (36%) (Parks Canada Agency 2006b). These participation levels were almost identical to those in a 2000 survey (Parks Canada Agency 2004a).

Wilderness experience and character

The wilderness character of KNP&R has been, and remains, an important attribute. The management plan lists the wilderness character of the park as one of the seven characteristics of its national significance.

The park management plan contains a variety of wilderness character objectives, indicators and targets for each of the major geographic areas within the park. These are monitored to determine if use has been kept within acceptable levels so as not to impair the wilderness experience that people are seeking (Parks Canada Agency 2004b).

Research from recreational use monitoring reveals that wilderness character targets under the management objective of providing opportunities for solitude and natural quiet were achieved in all but one instance. Actual encounter levels for the various park locations were all below targets, with the exception of the Alsek River, where the standard was exceeded only slightly (Morris 2007; see Appendix 3, Table 10).

The target for the wilderness management objective of providing high-quality wilderness experiences was reached in all areas, with the vast majority of all park users reporting a near or total wilderness experience (Morris 2007; see Appendix 3, Table 11).

For the wilderness management objective of providing pristine campsites with little if any sign of other recreational use, the lower the rating the more pristine and undisturbed the campsite. The target for this

indicator was reached in all areas except Ä'ą̈y Chù (Slims River) East, where it was exceeded only slightly (Morris 2007; see Appendix 3, Table 12).

Visitor/user segmentation

A range of survey research and staff input has been utilized to identify the major recreational user groups in KNP&R. The 2004 management plan identified eight park visitor/user groups based on their motivations, length of stay and activities: Locals; Day-Use/Overnight Backcountry; Extended Backcountry Trips and Mountaineering; Guided Trips; Yukon-Alaska Circle Tour; Alaska Bound; and General Public. Research carried out by Simon Fraser University (Haider and McCormick 2004) was based on a similar approach. The park offers a variety of recreational use opportunities to meet the needs of a range of users, including backcountry rafters, hikers, and mountaineers, as well as local users and vehicle-, canoe-, kayak- or hiking-based individuals.

Parks Canada's 2005/06 survey identified three types of visitors based on an analysis of what was important to them in their decision to visit KNP&R:

- The Learning Traveller is interested in learning about the various aspects of the park such as Aboriginal culture and history, and the plants and animals in the area;
- The Outdoor Recreationist is interested in participating in outdoor activities, but also wants to learn about the park; and
- The Value-Driven Visitor looks for value in their trips while they participate in park activities.

The social science research results to date indicate that there are many ways to segment or characterize KNP&R visitors/users. Continued research in this field will help managers make decisions that support high-quality recreational experiences.

Understanding visitors/ users 8.2.1.1	Strengths	Challenges
Visitor/user markets (their motivations, needs and expectations) are clearly defined, prioritized and understood	• User/visitor audiences are defined for the park • VIP satisfaction surveys in 2000 and 2005/06 measure performance standards • In-depth wilderness surveys completed in 1996 and 2002 provide detailed insights about the motivations, perceptions, attitudes, and preferences of Kluane's frontcountry and backcountry users and local area residents • Yukon government exit surveys in 1999 and 2004 reveal some regional information about visitors to the Yukon and the Kluane region • Some information on the motivations, needs and expectations of locals was captured in a local questionnaire conducted in 1999 by the KPMB	• Data about audience groups needs to be updated, consolidated and simplified with new research findings • Parks Canada does not understand or research its potential audiences • User/visitor audiences are not clearly prioritized • The survey databases need to be consolidated, analyzed and summarized in a manner that enables them to be more effectively and efficiently used to guide park management decisions • Parks Canada needs to work more closely with Yukon Tourism & Culture to collect information specific to Kluane through their visitor exit surveys • The interests and needs of some target audiences, such as schools, locals and bus tour groups, might be better collected in a different way

8.2.1.2
Measure: changing demographics, emerging trends and trends in regional leisure and tourism understood

Target: Not yet established

The Yukon government's 2004 exit survey (Government of Yukon 2006) found the number of non-resident visitors to the Kluane region was 9% lower than in its 1999 exit survey (116,635 in 2004 versus 128,795 visitors in 1999). The 2004 survey also found that 109,321 visitors actually stopped in the Kluane region, up 18% from the 1999 survey (Government of Yukon 2006).

Changing demographics (i.e., aging population, baby boomers), visitor expectations, factors affecting tourism (price of fuel, services and facilities, etc.) and travel patterns all influence visitors to KNP&R. Ongoing research and monitoring, as well as accurate analysis, is required to stay abreast of these changes and assist decision-making about park services. Both in-house and external research should be planned, undertaken, and consolidated. The results can help define how to meet the needs of both current and future visitors/users.

Adapting park services and experiences based on changing demographics, tourism expectations, and local needs and interests is one of the major challenges facing KNP&R managers. Efforts are underway to gain a better understanding of the changing visitor market through coordination of visitor surveys and joint marketing studies.

Economic impact of KNP&R

A 2005 Kluane National Park and Reserve Economic Impact Analysis report (Zanasi et al. 2005) indicated that the park's average annual expenditures were $2.11 million (1999–2004). Over the same period the park directly created about 28.5 person-years of employment (15 full time and 20 part time), with an average annual payroll of $1.23 million. The park also supports employment and income opportunities for more than 40 tourism and aircraft operators, who provide guided trips and/or aircraft access into and over the park. For three years, Parks Canada had a contract to provide guided interpretive programs for Holland America clients. In 2006, these programs were taken over by private Haines Junction operators, providing employment and income directly to the local operators.

The report estimated total annual visitor spending associated with Kluane National Park and Reserve at $3.21 million, based on 75,478 non-resident visitors spending an average of $42.50 each. The report indicated that all spending associated with KNP&R adds $2.5 million to the Yukon's GDP and enhances labour income by $2.2 million. It also estimates that this spending generates an additional $57,000 in property and excise taxes for the Yukon government, and more than 57 person-years of employment per year.

When comparing spending specific to the park to that within the Kluane region (the Alaska Highway north to Beaver Creek, east to Champagne and the Haines Highway south to the B.C. border), the 2004 Yukon government exit survey (Government of Yukon 2006) reported that total spending in the Kluane region was $6,560,607, down 4.5% from the 1999 survey. The survey reported that each tourist party in the Kluane region spent $103, up about 7% from the 1999 survey when such spending was $93. These expenditures include both park and non-park visitors. Parks Canada's 2005/06 visitor survey (Parks Canada Agency 2006b) found that visitors who stopped at KNP&R sites spent $283 per group within 80 km of the park.

The Yukon government survey found that just 6.6% of the visitors questioned stopped or spent a night in KNP&R.

A 2002 park survey of visitor spending within 80 km of the park by SFU (Haider and McCormick 2004) found that expenditures varied by type of group. More money was spent by backcountry visitors, who often have aircraft support or are guided by commercial operators: $1,375 by mountaineers, $1,300 by rafters and $390 by hikers. Frontcountry highway visitors reported group expenditures between $190 and $200.

Understanding visitors/ users 8.2.1.2	Strengths	Challenges
Changing demographics and emerging trends are understood, regional leisure and tourism trends are understood	• Yukon government exit surveys of non-resident travellers provide a source of regional tourism and trends • Information is shared by Parks Canada and Yukon Tourism & Culture more often than in the past	• Parks Canada needs to better understand emerging trends in tourism, recreation and education • Parks Canada does not take advantage of research that is available from other regions, such as Alaska

8.2.1.3
Measure: trends in visitation, activity and visitor use are monitored and understood

Target: Not yet established

KNP&R has experienced a decline in number of visitors over the last several years. Annual visitation to the park's VRCs at Haines Junction and Tachàl Dhäl has dropped 16% from a five-year average of 57,825 visitors a year in 1997–2001 to the current (2002–2006) five-year average of 48,573. Highway construction, shorter opening hours, forest fires and insect outbreaks in the area may have contributed to this decline, along with broader factors such as the attacks of September 11 and the rising price of fuel. There has been a change in the mode of travel by park visitors with fewer "rubber tire" or independent visitors (those traveling on their own in personal vehicles or RVs) and more bus tour travellers. Over the last five years the average annual number of independent travellers visiting the park's visitor centres has dropped 26% (from 41,580 to 30,769) while the number of bus-tour travellers has increased 9% (from 16,230 to 17,770).

Visitation to KNPR's road-accessible campground at Kathleen Lake has also been dropping, with a 15% decrease over the last five years. The campground currently averages 1,330 campers per summer.

Based on trail-counter data, day-use visitation to the park is estimated to range between 6,500 and 7,500 people per year. Day use in Kluane is the one sector that appears to be growing. This is based largely on staff observation but is supported by day-use activity reports from Kluane's licensed operators that demonstrate a five-year growth of approximately 7%. An average of 18 tourism operators provide "soft adventure" day hikes and van tour activities for about 1,260 visitor days during 210 trips per year in the park; this is 16 to 19% of the total estimated park day use.

Since 2001, overnight backcountry use has dropped about 32% to its current five-year average of 1,025 visitors per year (2002–2006). The number of tourism operators providing overnight trips services has also declined, from 22 operators in 2002 to 11 operators in 2006. Icefield mountaineering, Alsek River rafting, and Ä'äy Chù (Slims River) Valley hiking trips continue to be the most popular backcountry activities. These activities account for 10–30% of backcountry users and 20–35% of backcountry person nights.

Use of global positioning systems, satellite phones and lightweight, higher quality backcountry equipment has likely contributed to the lower number of emergency public safety responses in the park over the last several years. That said, when rescues do occur in Kluane's backcountry they are costly, high-profile events in isolated settings with significant risks.

Understanding visitors/ users 8.2.1.3	Strengths	Challenges
Trends in visitation, activity and visitor use are monitored and understood	• Visitor Centre statistics are recorded over the years on a consistent basis • Overnight use in the park is monitored and well understood • Mountaineering and rafting activities are closely monitored and managed • Some day-use information is captured through a network of trail counters and commercial operator trip reports	• Without a park gate entrance, exact park visitation statistics cannot be collected • Day-use is not well understood for trails and day use areas and has only recently (2004) begun to be monitored with trail counters • Methods of collecting park use statistics are not consistent or efficient • Parks Canada needs to better understand and respond to declining visitor numbers and changing visitor trends

8.2.2 Providing opportunities

The four measures listed below related to providing opportunities are drawn from the VE assessment but may be modified in future as a national VE performance measurement framework develops.

8.2.2.1
Measure: visitor/user experience opportunities are effectively communicated and useful pre-trip planning information is readily available

Target: Not yet established

Opportunities are conveyed to visitors/users in a variety of ways, ranging from the park's website to brochures to discussions with park staff at reception centres. Finding ways to determine the best tools to use and to assess their effectiveness would help streamline and strengthen communication in this area.

Providing opportunities 8.2.2.1	Strengths	Challenges
Visitor/user experience opportunities are effectively communicated and useful pre-trip planning information is readily available	• Park website and brochures communicate the range of recreation opportunities available. • Staff provide a high level of personalized service (by phone, e-mail and in person) to assist users in planning their visit. • Mountaineers receive a high level of personal service for their expedition planning. • The Yukon government includes park information in their tourism publications.	• Trip planning information for all backcountry users (i.e., mountaineering video on-line, a set of frequently asked questions posted on-line) could be streamlined so users are less reliant on personal service. • Trip planning information for day users and day hikers is not as accessible or organized as backcountry information.

8.2.2.2
Measure: way finding and signs are clear and complete. Visitors are welcomed and oriented to park services available by staff, signs and other media

Target: Not yet established

Visitors to the Kluane region are often not aware they are close to a national park or a World Heritage Site. The 2005/06 VIP survey (Parks Canada Agency 2006) found that when respondents were asked to list where they had camped in KNP&R, fewer than half of them (43%) listed areas that were actually in the park. The management plan identifies the need to improve the sense of arrival to the park, including improved highway signage, park identifier signs and interpretive signage at highway pull-outs.

The red ranking is due to a lack of highway signs and identifiers; a lack of welcome or sense of arrival; a lack of external orientation exhibits; and reduced services.

Providing opportunities 8.2.2.2	Strengths	Challenges
Way finding and signs are clear and complete. Visitors are welcomed and oriented to park services available by staff, signs and other media.	• Interpretive and trailhead sign project is improving visitor orientation and public safety information. • Parks Canada staff provide accurate information in a friendly and professional manner. • Yukon Tourism staff work in the Kluane Visitor Centre and provide information about opportunities and services available in the region.	• Current highway directional signs are unclear, outdated, unilingual or, in some areas, nonexistent. • There is a lack of "points of entry" or park identity signs on arrival to the park to welcome visitors and orient them to the services available. Visitors may not know they have arrived at a national park. • Visitors drive past a large portion of the park before they reach a visitor centre. There are no signs to greet and inform visitors when they arrive at the park. • Hours of operation at the visitor centres have been reduced in the last few years. • There are no exhibits outside the visitor centres to provide information when the centres are closed. • There are no exhibits providing information about recreation opportunities or public safety concerns.

8.2.2.3
Measure: capital assets are appropriate for current and potential visitor needs and expectations

Target: Not yet established

Given its origins as a wilderness park, KNP&R has a limited number of visitor services and facilities. Most of the current facilities were developed in the late 1980s and have not been adequately maintained in recent years. Many of them require major recapitalization. Visitor facilities include two VRCs, a 39-site campground accessible to vehicles and day-use area, about 200 km of maintained trails and roads (and associated backcountry campsites) and 400 km of hiking routes known to staff. Visitors can learn about recreation opportunities before their visit through park literature, by contacting park staff and through the park website. Visitor service staff provide important park orientation and safety information at the two visitor centres, while park wardens assist mountaineers in planning their expeditions into the icefields.

The KNP&R VRC in Haines Junction was built in 1980 to accommodate visitor reception and park administration. It is a focal point for visitor contact and delivery of key park messages. Through an agreement with the Yukon government, territorial tourism services are also available at the VRC. Since 2003, due to resource reallocation, the centre has stopped being open year round and is now open only by appointment from October to May. A major recapitalization of the building and its interpretive products and services is in the planning stages and will be implemented over the next four years.

The Tachàl Dhäl VRC, located on the Alaska Highway at the mouth of the Ä'äy Chù (Slims River), is open seasonally from mid-May to early September. Like the KNP&R VRC in Haines Junction, it has experienced the effects of budget restraints and now has a shorter season and fewer operating hours. It is important for interpretation, visitor services and overnight hiker registration for the north end of the park. Approximately 16,000 visitors per year visit the centre. It is hoped that the Tachàl Dhäl VRC will be the future focus of KFN's economic development opportunities associated with the park.

The 200 km of trails and roads in KNP&R are generally well defined with signs, posts, trailheads and obvious walking surfaces. Most of the existing trail system in KNP&R is based on old mining roads and trails built before the park was established. The trails range from easy 20-minute walks to more difficult five- to six-day hikes. Some trails, such as the Cottonwood, have become more difficult in recent years because of bridge washouts, campsite closures and a change to designated campsites. In contrast to trails, routes typically follow no formal path and are not maintained by the park. Recent reductions in the park trail crew has led to a longer trail maintenance cycle that may not meet visitor expectations, public safety requirements or ecological integrity standards. More work has been needed to keep the trails maintained with the increased number of standing dead trees from the outbreak of spruce bark beetle and more downed trees across the trails. The park is faced with reducing the number of maintained trails in the park. These decisions require careful consideration of visitor needs, budgets, ecological integrity and public safety standards.

Providing opportunities 8.2.2.3	Strengths	Challenges
Capital assets are appropriate for current and potential visitor needs and expectations.	• New interpretive and trailhead signs have improved visitor information. • New exterior washroom building addresses demands from bus groups.	• Planning on capital assets is not based on well-researched information about current and potential visitor needs and expectations. • Parks Canada is not able to maintain its existing facilities due to lack of resources. • There are no day-use facilities in the north end of the park. • Providing drinking water at the campground and Tachäl Dhäl Visitor Centre is challenging. • The trail system is not designed for visitor needs and expectations (largely utilizes old roads and access trails). • The KNP&R VRC requires recapitalization to improve visitor experiences and reflect current park messages.

8.2.2.4
Measure: a range of opportunities are available that respond to visitor/user needs and expectations, provide for learning and inform visitors of the challenges and issues facing KNP&R

Target: Not yet established

In order to provide a range of recreational and visitor services for visitors with varying interests, needs and abilities, KNP&R is divided into seven geographic areas. Each area has specific objectives for ecological and visitor experience that determine the type of experience that will be provided, the level of services and facilities offered, the degree of management controls imposed, the targeted levels of use and the ease of visitor/user access. Recreational opportunities include a vehicle-based camping and day-use area at Kathleen Lake, and interpretive highway pull-outs, short frontcountry day hikes, and remote backcountry experiences such as rafting the Alsek River or hiking the Dän Zhür Chù/Donjek routes. These backcountry options offer few, if any, services or facilities. The icefields offer world-class mountaineering and ski touring opportunities for experienced trekkers while flightseeing tours appeal to a broader visitor group.

A working group was established during the 1999 management plan review to provide local input into the revision of recreational opportunities in the park. The 2004 park management plan builds upon and broadens the visitor opportunity focus beyond the traditional "wilderness" experience offered by the park. New activities include a boat-based tour of Kathleen Lake and a fly-in tent camp in the icefields.

Interpretive experiences along the highway at trailheads, pullouts and day-use areas have been enhanced with the development of new trail signs and interpretive signs. This will continue as the park sign project proceeds. Since the 2004 management plan, however, winter ski-trail-setting has decreased due to budget reductions and a review of avalanche risks. Improving opportunities for visitors to experience local First Nations culture also remains a challenge.

About 42 tourism operators provide a safe and enjoyable recreational experience to a broad range of KNP&R visitors who would likely not otherwise visit the park. Services and activities include guided mountaineering, aircraft flightseeing, fishing, dog sledding, horse trips, day and overnight hiking and rafting. Tourism operators are valued for the work they do in providing facilitated visitor experiences

to park visitors. They are also important park stakeholders who provide useful feedback on natural resources and visitor experiences. Tourism operators could be more involved in communication of key park messages if information was better packaged for their use.

Providing opportunities 8.2.2.4	Strengths	Challenges
A range of opportunities are available that respond to visitor/user needs and expectations. These opportunities provide for learning and inform visitors of the challenges and issues facing KNP&R.	• A range of recreational use experiences is available; these have been categorized into seven geographic areas in the park. • The park maintains 200 km of hiking trails and approximately 400 km of hiking routes. • Two park-sanctioned trips each year allow the local community to experience the park by snowmobile. • An average of 42 tourism operators provide for a broad range of hiking, mountaineering, sightseeing, rafting, boating, dog sledding and fishing services.	• Not all visitor experience opportunities in the park provide for learning. • Recent budget cuts to trail maintenance crew have reduced the ability to maintain all the park trails. A reduction in the number of maintained trails is likely. • Highway corridor opportunities are limited. • Key park messages need to be packaged for use by tourism operators.

8.2.3 Delivering high-quality service

Some quantitative data is available to assess the delivery of service to visitors. The two measures related to providing opportunities (8.2.3.1 and 8.2.3.2) are drawn from the VE assessment but may be modified in future as a national VE performance measurement framework develops.

8.2.3.1 Measure: the state of perceived service quality received by visitors

Target: 85% overall visitor satisfaction, including at least 50% very satisfied (national target).

Parks Canada has national performance standards for visitor satisfaction: a minimum of 85% of visitors should be satisfied with their experience with at least 50% being very satisfied. The national Visitor Information Program (VIP) is the primary means for evaluating whether national performance standards are being met. Visitor feedback is also solicited through comment cards.

Respondents to the 2005/06 VIP survey reported high levels of satisfaction with various aspects of the KNP&R experience (Figure 21); 97% of visitors reported being satisfied (18%) or very satisfied (79%) with their overall visit to the park. The visit as a memorable experience overall was rated as 14% satisfied and 82% very satisfied, for an overall satisfaction rating of 96%. Evidence of overall satisfaction is also inferred from whether a visitor would recommend KNP&R to others: 77% of respondents indicated they would very likely recommend KNP&R as a place to visit to their family and friends, while only 1 of 238 respondents was not likely to recommend it. It is also clear from the results that interactions with park staff receive a very high satisfaction rating.

Figure 21. Level of visitor satisfaction with KNP&R visitor services and facilities

Source: Parks Canada Agency 2006b

The overall satisfaction level in 2005/06 was 15% higher than in the previous VIP survey in 2000 (Parks Canada Agency 2004a). Satisfaction levels were 2 to 15% higher for service in language of choice (82% very satisfied), hiking trails (52% very satisfied), helpfulness of staff (82% very satisfied) and courtesy of staff (88% very satisfied). Two areas where satisfaction was lower in 2005/06 were the park as a recreational experience and value for money, which had 4% and 20% lower "very satisfied" ratings. Three areas failed to meet the national target (50% very satisfied): availability of park information prior to trip; receiving high-quality service; and value for money. Satisfaction with hiking trails and satisfaction with visitor centre hours barely met the national target. Attention to these five areas is needed. When responding to questions about what KNP&R could do to make their next visit better, 39% of respondents identified improving various aspects of park infrastructure with roads, campgrounds and washrooms the most commonly named.

Delivering high-quality service 8.2.3.1	Strengths	Challenges
The state of perceived service quality received by visitors: 85% overall visitor satisfaction, including at least 50% very satisfied (national target).	Park visitors report 97% overall satisfaction with their visit to the park. Overall satisfaction was 15% higher than in the 2000 survey. Staff courteousness and helpfulness, and service in language of choice also ranked high.	• Availability of park information prior to trip, receiving high quality service, value for money, hiking trails and visitor service centre hours need to be addressed. • More precise and systematic visitor satisfaction reporting and monitoring, which could be used on an annual basis, is needed. • Parks Canada does not have a mechanism to measure satisfaction from other users such as school groups, bus groups and local users.

8.2.3.2
Measure: public safety services are provided to visitors/users

Target: Not yet established.

In a mountainous mountain park like KNP&R, public safety is a major concern. Safety is a shared responsibility; visitors must take precautions that reflect the risk involved in their chosen activity and park staff must concentrate on awareness and education aimed at prevention, supported by search and rescue capabilities.

KNP&R's ecological integrity, isolated setting and associated public safety risks has staff spending considerable time on pre-trip planning efforts so recreational users are well prepared prior to entering the park. Recreational use research such as that carried out by MacDougal and Wellwood (2007) provides direction and guidance — both park-wide and corridor-specific — on the ongoing need to fine-tune and/or improve KNP&R's bear safety education and awareness information programs. This is necessary to ensure that recreational users have safe and memorable visitor experiences with limited impacts on the park's ecological integrity.

KNP&R's public safety program focuses on staff training, pre-trip information for park users and search and rescue services. The park's resource conservation staff receive regular training and certification in advanced first aid; avalanche safety; water rescue; mountaineering skills; helicopter sling rescue and ground search and rescue.

Resource conservation staff participate in search and rescue operations, both within the park and, occasionally, outside of the park if requested by other agencies such as the RCMP. Although there are few incidents, they are usually expensive, and tend to require a high level of expertise and technical skills and specialized equipment.

Delivering high-quality service 8.2.3.2	Strengths	Challenges
Public safety services are provided to visitors/users.	• Safety messages have been improved with new trailhead signage. • Public safety messages and information are conveyed during trip preparation with staff. • Park staff are trained and provide high-quality search and rescue services in cooperation with other nearby agencies.	• Public safety training and search and rescue operations are costly. • Based on research, there is a need to fine-tune and/or improve Kluane's bear safety education and awareness information programs.

8.2.4 Connecting visitors/users personally with place

A meaningful and engaging experience can have physical, emotional, intellectual, and spiritual dimensions. Parks Canada can facilitate visitors' and users' personal connection to place by understanding their needs, and by providing appealing opportunities through high-quality service. Connection to place is the ultimate outcome of a meaningful experience, and the level of this connection determines the strength of support for Parks Canada.

While visitors' personal connections with KNP&R can be profound, this is a new performance area to measure. Park staff do not yet have ways to measure connection to place; as a result it is not assessed in this report.

9. State of Cooperative Management

9.1 Introduction

In 1995, the Kluane National Park Management Board was created out of the CAFN Final Agreement to cooperatively manage KNP&R. KFN joined the board in 2004, following the signing of their final agreement. Membership on this board, and the manner in which KNP&R is managed, has changed over time. The board is an advisory body that provides advice to elected representatives and officials of KNP&R, CAFN, and KFN.

A cooperation agreement between KPMB, CAFN, KFN and KNP&R was signed in November 2004 to assist in the management of KNP&R. The agreement facilitates cooperative management of KNP&R. As the board's understanding and relationships change over time, it is important to periodically assess these changes to ensure that all parties continue to share a common understanding of cooperative management. To provide input to this SOPR, the cooperative agreement signatories (KPMB, KNP&R, CAFN and KFN) undertook an assessment of current cooperative management of the park and identified ways to improve future management.

The issues can be grouped into four broad categories:

- Board Processes – These include board training; board membership; understanding of cooperative management; understanding board goals and objectives; achievement of goals and objectives; effectiveness of meetings; decision-making; and reporting.
- Board Relationships – These include board interactions; roles and responsibilities of board members; fulfilling roles and responsibilities; board influence; board credibility; and communication.
- Outcomes – These include board priorities; board achievements, successes and opportunities; experience on the board; and board effectiveness.
- Current and emerging issues for board attention, which include potential emerging issues and future challenges.

The assessment consisted of conducting telephone interviews with both board members and people who have regular contact with the board. Interview guides were tailored to each of the two groups. Ten people completed the board interview questions, and eight people participated in the non-board interviews.

9.2 Assessment of Cooperative Management

Board processes

Interviews with board and non-board members indicated that board membership and training is an area that could be improved. Neither board or non-board respondents thought that board members needed to bring any specific skills or abilities to the board. They acknowledged, however, that board members could be trained after they joined the board to help improve their participation. Useful board training fell into two broad areas: board expectations, including a clear understanding of board expectations, roles and responsibilities; and effective board operations and interactions, such as running and chairing meetings, as well as skills in listening, communication, interpersonal relationships, and facilitation.

The term "cooperative management" had numerous meanings for the interviewees. Most of them stated that cooperative management meant coming together from different perspectives to work as a team and to share management and decision-making for the park. Within these words, people had different interpretations of what the words mean. There was some confusion about the difference between cooperative management and co-management,[32] with some respondents using the two terms interchangeably. Some people perceived a difference

32. "Co-management is defined as a situation in which two or more groups negotiate, define and pursue amongst themselves a sharing of the management functions, entitlements and responsibilities for a given territory, area or set of resources" (adapted from Borrini-Feyerabend et al. 2000 in Parks Canada 2007d, p. 19). According to Parks Canada, cooperative management "describes a specific type of relationship between Parks Canada and advisory bodies that are established by formal agreement to advise the Minister or Minister's designate" (Parks Canada Agency 2007d, p. 19).

and said that co-management is an equal weighting, which is not the case in KNP&R. One person referred to the current arrangement at KNP&R as "cooperative consultation." To help reduce this confusion, it would be extremely useful to develop a common understanding of what cooperative management is and is not and how it is applied at KNP&R.

Half of the board respondents thought that board meetings were run effectively, while a couple of people stated that meetings were difficult to follow, lacked focus, and were repetitive. Two people mentioned that board attendance was sometimes poor or people go on holidays, which reduced the effectiveness of meetings. Mention was made that board meetings need to be more effective. Several members mentioned that the board is effective in making decisions, and that consensus is usually or always reached, with very little conflict.

Board relationships

Another source of confusion results from board members' differing perceptions of their roles and responsibilities. Some board members believe that their role is to manage and direct the park, while others perceive their role as setting policy, leaving day-to-day operations to park employees. It was also unclear as to whom the board is accountable to and where the board gets its direction. There was confusion with regard to the park's role, as to whether it is to support the board in achieving board endeavours or whether the park operates independently without board direction.

Most respondents thought board interaction was positive and felt that all board members got along. When board members were asked to rate the board's performance in a number of areas, "respect towards each other" and "commitment to cooperative management" were rated the highest, and "communication with each other" was rated lowest. Some respondents believed all board members freely expressed their points of views, while others thought the board might be too amicable, with some members hesitating to speak up due to the fear of creating conflict. Overall, most board members enjoyed their

CAFN member Shauna Strand scrapes a moosehide to soften it, under the careful instruction of KFN Elder Lena Johnson, August 2006, Ätthän Gän (Dry Meat) Camp. CAFN photo

experience on the board, using words such as learning or personal growth, enjoyment, challenging, eye-opener, and enlightening to express their feelings. Participants were generally positive about their board involvement; however, frustration was also expressed by eight of the ten board interviewees.

Interaction among board members is positive. An area where the board could improve its interaction and relationships is with non-board members. Five of the eight non-board interviewees indicated that the board had improved its relationship with others; however, five non-board respondents also thought this was an area that the board needed to improve the most.

Both board and non-board members felt that making recommendations was a board responsibility. When asked how seriously they thought the park considered board recommendations, respondents indicated that greater consideration was given when recommendations were appropriate and policy related; however inappropriate recommendations related to park operations may be given less consideration. Differences in opinion were expressed as to who received board recommendations, whether it was the Minister and/or the park. The board and the park may have different expectations regarding appropriate recipients of these recommendations, which could partially be due to the lack of clarity with respect to respective roles.

The perception of the board's influence was mixed, and often depended on the issue under consideration. The board's influence was thought to be greatest in setting priorities, and less for park management and planning.

Several people commented that public communication was one of the board's major roles and that it needed to improve. It was acknowledged that the current methods of communication, such as open houses and newsletters, were not very effective. There was also a general perception that the local community had little awareness about the board and what it did. Mention was made that the introduction of the two guided snowmobile trips per year for the community to experience the park were positively received and have helped improve community relationships.

When asked how different groups of people perceived the board's credibility, board members tended to be more critical than non-board members. Mention was made that the board's credibility was improving; however, there is room for improvement, and it takes time to build.

Outcomes

When asked about board priorities, more than one person said no-harvest zones, recapitalization of the KNP&R VRC, and guided snowmobile trips into the park.

Both the board and non-board comments related to board achievements were considered together. The achievement that was identified most frequently was the board's improved relationships and communication with the community, First Nations, and park staff. Board achievements that were mentioned by more than one person included guided snowmobile trips into the park for the local community who are not First Nations; "Healing Broken Connections" for using traditional knowledge in park management; no-harvest zones discussions with CAFN; the cooperative management conference; production of signs in three languages (English, French and Southern Tutchone); and development of the management plan.

When asked about areas that the board could improve, respondents generally indicated that everything was fine, and had to pause and think before coming up with comments. Both board and non-board members identified board interaction and relationships with others most often as an area for improvement, given by eight people. Three people thought that participation and attendance at the open houses could be improved. It should be noted that relationships, which were identified as an area for improvement, are a key component of the cooperative management agreement, since its effective implementation is dependent on the relationships among the four signatories.

The effectiveness of cooperative management was rated in the middle, with most respondents indicating support and commitment to the process. There is, however, still significant room for improvement. Interviewees commented that cooperative management is an evolving process, and that it takes time to fully understand and appreciate its power and potential.

Current and emerging issues for board attention

Several future challenges were identified for the board. Challenges related to cooperative management or the board included retaining good board members, and fostering a better understanding/appreciation for cooperative management. Items related to First Nations were harvesting, "Healing Broken Connections," and the integration of traditional knowledge into park management. Environmental issues include the spruce beetle outbreak, climate change and the changing ecosystem, along with transplanted species and wildlife. Relationships with the community and with the Minister were also mentioned.

Overall assessment

Based on the qualitative assessment of cooperative management derived from recent interviews, cooperative management is given a yellow (fair) rating. The primary issues currently facing cooperative management are outlined in Chapter 12.

10. Assessment of management actions

The 2004 KNP&R management plan contains a variety of actions to further the work of KNP&R. This section is not a comprehensive review of the management plan actions, but rather an assessment of large-scale, intervention-oriented or proactive management actions that have had a positive effect on the park (Table 6). Over time efforts will be made to make these assessments less qualitative and more quantitative.

Table 6. KNP&R management plan actions

Management objective	Management action	Effect
To maintain and enhance the park's ecological integrity.	Integrated Planning and Management • Significant involvement of Parks staff with CAFN and others in the development of CAFN Traditional Territory Forest Management Plan, the Integrated Landscape Plan for the CAFN Traditional Territory and ongoing work with plan implementation. • Creation of an Integrated Landscape Management Specialist position within the field unit. Cumulative Effects • Cumulative effects assessment in 2002 updated 1995 research and provided recommendations related to EI and visitor experiences which influenced the 2004 management plan. EI Monitoring • EI monitoring of kokanee salmon since the 1970s led to detection of a dramatic decrease since 2002 (see section 5.4.4.2). Working groups consisting of scientists, park staff, First Nations members and local community members have undertaken various studies and public communications to seek causes, engage locals and educate students and the public. • Sport-fishing of kokanee salmon is closed in the park.	• Involvement with forest planning outside KNP&R helped ensure the protection of important wildlife habitats and corridors and involved the park in fuel abatement programs within the park. These activities provide Parks Canada with a greater understanding of the community's socio-economic needs and provide partners with a greater understanding of the role of protected areas within the landscape. • The Integrated Landscape Management Specialist position increases the park's influence in the greater park ecosystem, improves planning coordination, and allows for more sharing of information and data. • Cumulative effects assessment has allowed proactive actions to avoid potential adverse effects of activities, e.g., implementation of the Alsek Moose Management Plan. • Kokanee numbers are still very low, but more knowledge has been gained, TK has been gathered, and park staff have engaged in community involvement and public education.

Management objective	Management action	Effect
To recognize aboriginal cultural landscape as an integral part of the KNP&R ecosystem, and, through the expression of traditional knowledge, a significant contributor to ecosystem management	• "Healing Broken Connections," a four-year national EI Theme Project (see section 5.5 and Table 4 for details) • Culture camps in the park in 2004, 2005, 2006 and 2007 • Use of Southern Tutchone place names in the management plan, park brochures, new signs, interpretive programs, trail descriptions, website and marketing materials	• See section 5.5 and Table 4 for details • Improved awareness of the Southern Tutchone language; recognition of the importance of land use to First Nations culture; and community pride in the use of FN language
To maintain a viable population of grizzly bears and minimize human/bear conflicts	• Mandatory use of bear-proof canisters by hikers in areas used extensively by bears • Enhanced visitor/user awareness through improved information/orientation • Participation in the development and sale of the video "Staying Safe in Bear Country" • Permanent closures of high-risk backcountry campsites, and mandatory use of lower-risk designated campsites (see sidebar, page 57) • Averse conditioning of potential problem bears • Alsek River guidelines, campground assessment • Zone I Alsek/Kaskawulsh Grizzly Bear Protection Area • Electric fence at Haines Junction landfill	• Many of these actions have reduced the impacts of recreational use on the park's EI, increased visitor awareness and enhanced visitor experiences
The enduring human presence in the ecosystem is acknowledged, fostered and respected by protecting and presenting the cultural resources and values of KNP&R	• Archaeological inventories conducted in the southern portion of the park, concentrating on areas under greatest pressure from visitors • Brush Huts project at Ä'äy Chù (Slims River) Valley	• Expanded knowledge of the location, type, age and cultural affiliation of archaeological resources in the park • Enhanced evaluation of the condition and threats to the integrity of cultural resources in KNP&R • More informed management decisions • Enhanced knowledge and community awareness of ethnohistory of KNP&R • Improved cooperative relationship between Parks Canada, CAFN and KFN • Enhanced knowledge through the inclusion of Elders in the fieldwork has brought First Nations people back to places their families once frequented

Management objective	Management action	Effect
To enhance and engage visitors, users and students in the understanding of the park's values, heritage and issues	• A major project to replace and install new trailhead and interpretive signage at trailheads, highway pull-outs and day-use areas from 2003–2010; signs have key user orientation, safety and interpretive messages; content developed collaboratively with CAFN and KFN • Development of Grade 7 classroom program and annual delivery to 245 students in local communities since 2004/05 (77% of target audience) • Development and delivery of kokanee salmon communication programs and products to visitors, students, both on-line and in Yukon communities	• Improved awareness of park and better orientation to recreation opportunities; communication of key messages about park safety, ecology and culture and appropriate behaviour; improved awareness of Southern Tutchone place names • Improved working relationship with FN partners, fostering shared pride in final product • Heightened awareness on the part of local and Whitehorse students about the park, land-use issues, bear biology and appropriate behaviour while visiting/using the park • Increased information about the decline of the kokanee salmon population and the role of ecological monitoring in maintaining the park's EI; cooperation between the park and local users in developing the materials on kokanee salmon
To provide a range of high-quality visitor/ user experiences, allowing visitors and users with varying interests and abilities to enjoy the park while protecting its EI	• Visitor experience and ecological objectives were established in the 2004 park management plan for the seven major visitor use areas, offering a range of visitor experiences from family roadside camping to world-class wilderness rafting and mountaineering • Since 1996, periodic research has examined campsite impacts and visitor experiences related to opportunities for solitude, natural quiet and wilderness experience; indicators and targets have been established for major visitor-use corridors and are monitored on a cyclical five-year basis • Proactively established quotas and reservations for backcountry use in the 2004 management plan • Surveyed visitor use patterns and satisfaction through Wilderness Use Survey in 2002; client satisfaction surveys in 2000 and 2005/06; and a community questionnaire conducted by KPMB in 1999; trail monitors put in place to monitor use starting in 2004 • Construction of new seasonal washroom facility at the KNP&R VRC as part of the recapitalization project, open for use in 2006	• Maintained EI in major visitor use areas while maintaining visitors' satisfaction with their wilderness experience • Improved understanding of the use patterns, motivations and satisfaction levels of park visitors • Improved visitor experience at the KNP&R VRC

Management objective	Management action	Effect
To demonstrate sound environmental practices	• Tachàl Dhäl Visitor Centre operates off the grid with reused solar panels and wind power; park mountaintop radio repeaters, with one exception, are powered by solar energy • Park staff use four-stroke snow-machines and outboard motors with similar technology • Requirement for four-stroke outboard motors on Mush Lake by 2012 • In 2006/07 three underground heating fuel tanks were removed at the farm and replaced with double-walled above-ground tanks • Working with the Village of Haines Junction, Parks Canada implemented a strategy to utilize natural park wetlands in order to increase the treatment of effluent released from the Haines Junction sewage lagoon facility prior to its being discharged into the Dezadeash River	• Reduced environmental impact of park operations and recreational park use • Use of solar energy at mountaintop repeaters has reduced Parks Canada's use of hazardous chemicals (disposable potash batteries) and the number of maintenance trips to these sites • Improved EI through the rehabilitation of three contaminated sites • Improved water quality

Ä'ą̈y Chù (Slims River) Valley: Combining Research with Education to Improve EI and Visitor Experience

A 1997 research project studied bear-human interactions in the Sheep Bullion Plateau area of the valley:

- the area accounted for 27.5% of the reported bear-human interactions for Ä'ą̈y Chù (Slims River) Valley study area despite having just 8.3% of overall visitor use;
- large numbers of bears, especially family groups, were observed throughout the summer;
- the area provided high-quality feeding habitat throughout the summer; and
- bears demonstrated habituation and potentially aggressive behavior in campsites on the plateau.

These findings led to the closure of the Sheep Bullion Plateau to overnight camping in 1998. An updated analysis of hiker-bear interactions in the area evaluated the effectiveness of the overnight camping closure (Figure 22). The investigation found the overnight camping closure had several benefits:

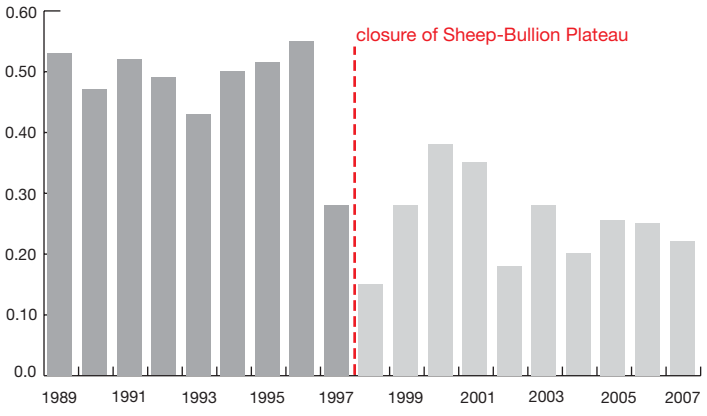
- a dramatic drop in hiker-bear interactions from 233 or 23.3 per year between 1989 and 1997 to 16 or 2.7 per year between 1998 and 2007;
- fewer interactions involving bear family groups; and
- no significant impact on user rates in the park.

Closing the area to overnight camping was an effective management action, which contributed to the maintenance of Kluane's ecological integrity and safer, high-quality visitor experiences.

The research project was also a successful education outreach experience. It was led by Sandra MacDougal, an ecology instructor at Red Deer College, Alberta, who used the project to provide her second-year students with real-life hands-on research as part of their lab. The required reading list for the ecology lab included several background documents pertaining to KNP&R. Students prepared PowerPoint presentations of their literature review findings and carried out statistical analyzes and interpretation of results from actual KNP&R hiker-bear interaction data. Students visited the KNP&R website and those of other national parks and protected areas and prepared public information brochures. They presented summaries of their data analysis in public presentations, which received positive coverage by the local *Red Deer Advocate* newspaper.

The project included an interactive website where students could post and discuss research results and findings with each other and KNP&R park staff. Both students and staff appreciated the interactive discussion page. One student commented, "This is just a quick note to thank you for taking such an interest in our work. It means a lot to many of us to actually be working on a worthwhile real life project… and the fact that you are actually paying attention to what we have to say makes the whole experience so much more valuable."

Figure 22. Average number of interactions per registered overnight party visiting the Ä'ą̈y Chù (Slims River) Valley, 1989–2007



11. Condition of information base

A range of research and monitoring databases were used to assess the condition and trend of the ecosystem indicators in this report. Parks Canada and the local First Nations recognize the importance of traditional knowledge and are finding ways of incorporating TK in park decision-making and the management planning processes. This SOPR includes some elements of traditional knowledge, but the parties are working together to find better ways of including TK in a more meaningful way for future management and reporting processes. Projects such as "Healing Broken Connections" are assisting with this important work, which will influence the next SOPR.

The majority of data sets used in assessing the ecosystem indicators come from one of two sources: 1) surveys carried out by the park's Warden Service; and 2) monitoring projects carried out by the Kluane Ecological Monitoring Project (KEMP), which often utilize existing research projects.

Wildlife censuses conducted on an ongoing basis in KNP&R by the Warden Service include moose, Dall's sheep, mountain goats and kokanee salmon. These long-term data sets have recently been fully digitized and analyzed for significant changes (Lee and Sykes 2008; Lee, pers. comm.). Small gaps in each of the data sets exist but do not prevent statistical analysis. Five of the KEMP databases were analyzed to assess the EI of forest ecosystems in KNP&R and surrounding areas. These data sets are fully digitized and are stored by the KEMP. An Analysis of Variance (ANOVA) of eight long-term databases examined whether patterns were similar for areas within and adjacent to the park (see section 5.4.2). Other than red squirrel and bearberry production, spatial variation for the KEMP measures was low, suggesting that trends are similar inside and adjacent to the park. This could change if and when development outside the park increases. The KEMP data sets have been statistically analyzed for measures of natural variance, significant population trends and management thresholds (see Krebs and Henry 2006, and section 5.4.2 of this report).

Observing berry production is an important part of ecological monitoring. Parks Canada/D. Henry

EI measures for the park's forests are also based on aerial surveys of spruce bark beetle outbreaks carried out by the Canadian Forest Service (CFS) for the park and the region. Since 1994 the CFS has produced annual maps that document the spread and intensity of the outbreak. In addition, 27 plots have been established in or adjacent to the park to assess the changing structure of these forests; these will be resampled in approximately 2015 (Garbutt, Hawkes and Allen 2006).

Grizzly bear research has been carried out in the park since the mid-1990s. R. Maraj recently completed a Ph.D. dissertation that assesses the health and stability of this population (Maraj 2007). Bear populations are notoriously difficult to count systematically, but data on the bear populations of KNP&R, collected since the early 1990s, have been catalogued and analyzed (see McCann 1998, Maraj 2007). Table 7 summarizes the quality of the data sets presented in Chapter 5. Data on recreational use has been systematically collected since 1992 and is effectively managed. Data document day and backcountry recreational use levels, backcountry campsite locations, bear-hiker/rafter risk assessments and encounter information and analysis, and campsite impact assessments. Monitoring of this data allows changes in recreational use patterns and their associated impacts to be identified. Data also document the effectiveness of several management actions in reducing encounters and problems with bears and in increasing the quality of the wilderness character of the park for visitors. The data needs to be captured, updated, and maintained in a central GIS-based meta database. This would allow for better

Table 7. Quality of data for EI measures relating to KNP&R

	Data range	Completeness	% digitized	Analyzed statistically	Power analysis
Precipitation and temperature	1945–2006	Some values estimated	100	Yes	No
Moose	1981–2006	One year missing	100	Yes	Yes
Spruce bark beetle aerial survey	1994–2006	No gaps	Annual map produced	No	No
Red squirrel *	1987–2006	No gaps	100	Yes	No
Snowshoe hare *	1976–2006	No gaps	100	Yes	No
Arctic ground squirrel *	1990–2006	No gaps	100	Yes	No
Breeding birds survey	#1: 1998–06 #2: 1999–06	No gaps	100	Yukon analysis	No
Mice and voles *	1987–2006	No gaps	100	Yes	No
Bearberry production *	1998–2006	No gaps	100	Yes	No
Dall's sheep	1976–2005	Some small gaps	100	Yes	Yes
Mountain goats	1977–2002	Some small gaps	100	Yes	Yes
Grizzly bears	1990–2007	Some gaps	Most	Some	No
Recreational use	1992–2006	No gaps	100	Some	No
Kokanee salmon	1976–2006	Some gaps	100	Yes	Yes
Water quality, Dezadeash River **	1993–2006	Some gaps	100	Being analyzed statistically for trends	No

*KEMP databases; **Environment Canada Water Quality monitoring databases (http://waterquality.ec.gc.ca)

presentation and analysis of recreational use information, particularly as it overlaps with data related to Kluane's natural and cultural resources.

Cultural resources in KNP&R have been documented through formal inventory surveys, assessments and limited excavations as well as incidental finds reported by park staff or visitors. Two major cycles of inventory survey have been carried out in Kluane. The first (1978–79) was primarily focused on documentation of historic mining-related sites; the second (1993–1999) attempted to document pre-contact and First Nations traditional-use sites.

The majority of inventory survey has occurred in the greenbelt area of the park including major river corridors (Donjek, Kaskawulsh, Ä'äy Chù (Slims River), Bullion Creek, Alsek River, etc.), lakes (Kathleen, Mush, Bates), high visitation areas (Donjek, Ä'äy Chù (Slims River), Alsek), trails (Donjek,

Cottonwood), and special interest areas (HooDoo Mountain). Gaps in coverage include mountain passes, high plateaus and the icefields.

Most assessment and monitoring have been conducted in conjunction with the inventory surveys (1978–1999); the last formal assessment of site condition was in 1999. About 59% of the approximately 253 documented park sites have been assessed at least once. The main gap in assessment data relates to historic mining-related sites that were recorded in 1978–79, prior to the establishment of formal evaluation criteria, and have not been revisited since their initial recording.

As with condition assessment, monitoring has been done primarily in conjunction with inventory surveys. Monitoring criteria and schedules have been proposed for all sites assessed since 1993; however, no formal monitoring programme has ever been implemented.

All documented sites in the park have been listed in a series of final reports on file at the park, the Western & Northern Service Centre (WNSC), and the National Documentation Centre. All original field notes, maps, images and the majority of artifacts recovered from park sites have been catalogued, and are curated at the WNSC in Winnipeg. Basic analysis has been performed on all artifacts collected from sites in the park in conjunction with the cataloguing process and some have been analyzed in more detail as required for program purposes. Artifacts are organized by archaeological site number and material type for ease of accessibility. A number of artifacts are on display at KNP&R and a small amount of material at the park still has to be recorded in the database.

All artifacts have been assessed as to their physical condition. In 2007 analytical data captured in the archaeology database was upgraded for consistency and accuracy as part of the WNSC's Collections Protection Program.

Of the 15,825 artifacts and samples recovered, 824 were selected for a site-specific reference collection. This provides an overview of the character and diversity of the artifacts and their suitability for display or reproduction. These artifacts will receive enhanced care for long-term preservation. They are complemented by an incomplete catalogue, which includes artifact descriptions, interpretive statements and photographs.

All information on the documented sites is managed and archived at the WNSC in Winnipeg. GIS datasets in electronic format, generated from the archaeology database, are periodically updated and sent to the park. To help make the site data readily accessible to the park, a Kluane Cultural Resource Inventory (CRI) Binder brings together information from a variety of sources. It contains tombstone data on each site, description of in-situ resources, site condition, assessment of significance, history of investigations and 1:50,000 NTS maps with locations. Its three-ring binder format allows it to be easily updated.

Data from the Parks Canada Visitor Information Program (VIP) was used to assess public appreciation and understanding and visitor satisfaction with onsite programming. A Parks Canada Visitor Experience Assessment was used to evaluate visitor/user experience. The Yukon government's 2004 Exit Survey (Government of Yukon 2006) was also used, as were more detailed visitor surveys conducted by SFU. Park staff also conducted an internal assessment of the park's interpretation and outreach program.

Ensuring adequate levels of statistically based confidence and representativeness through appropriate sampling methodology and sample sizes is a challenge in wilderness parks such as KNP&R with lower visitor use levels. It is particularly challenging to collect visitor group specific perspectives in issue specific categories such as satisfaction, motivation, management preferences and priorities. Social science researchers put considerable effort into sampling procedures to ensure statistical reliability and representativeness.

Using the current data to analyze public appreciation and understanding and visitor experience highlighted areas where information is lacking. This is discussed in sections 12.3 and 12.4. To assess cooperative management an interview survey was developed specifically for the SOPR and administered by WCSC staff. It is hoped that this survey might be useful to other cooperatively managed sites.

12. Key issues and challenges

12.1 Ecological Integrity

The national *State of Protected Heritage Areas for the period ending March 31, 2005* (Parks Canada Agency 2005) rates the state of EI in national parks as green, yellow or red, based on eight ecological factors (e.g., biodiversity, species loss, plant growth, developed areas) within the broader categories of land biodiversity, land processes and land stressors. KNP&R received a green rating for seven of these factors (there was insufficient data for the eighth). Although this indication of the park's high degree of EI is encouraging, the park is subject to stressors. Four issues — climate change, loss of traditional knowledge, adjacent land use and recreational use — are the principal stressors and threats to the park's ecosystems; the monitoring of EI is another concern.

Climate change

There is still much to learn about the current and future impacts of climate change on the park and surrounding environments, but the increased melting rates of glaciers and the unprecedented spruce bark beetle outbreak in the region over the past decade are indications that change is happening at a rapid rate. A pattern of slow and steady expansion of southern mammals, such as white-tailed deer, cougar (moving in on their own), wood bison (reintroduced) and elk (introduced) is also taking place (Henry et al. 2007) and a climate change conference in Haines Junction in 2006 reported many changes observed through TK, local and scientific knowledge (Alsek Renewable Resource Council and Champagne and Aishihik First Nations 2006). Continued monitoring is important and future adaptation may be necessary.

Traditional knowledge (TK)

Traditional knowledge, arising from First Nations' long-established relationship with the land, is a key contributor to the park's ecological integrity. The removal of First Nations people from the area for several decades, compounded by other social upheaval and an initial poor working relationship between First Nations and Parks Canada, led to a limited amount of TK related to the park area that could be incorporated in park decision-making. Projects such as "Healing Broken Connections" are important in helping Southern Tutchone people reconnect with their traditional lands within the park. Mechanisms are needed to help integrate TK into park decision-making in meaningful and respectful ways.

Adjacent land use

The current and anticipated increase in land use adjacent to KNP&R raises concerns, especially since only 18% of the park is vegetated and several large-mammal populations travel inside and outside the park. Anticipated increased regional forestry activities, including a potential harvest of a million cubic metres over the next ten years, could contribute to habitat loss, habitat fragmentation and loss of ecological connectivity. Continuing work with CAFN and the Yukon government on the CAFN Traditional Territory Forest Management Plan and its implementation will be important.

The regional projects and activities outside the park with the greatest potential to affect the park are, in order of significance (scale and probability): hunting; forestry; pipeline; highways; and community growth (Slocombe, Danby and Lenton 2002). Parks Canada will need to monitor changes over time and work with others to ensure that park interests are considered.

Mountaineering in the icefields. Parks Canada

Recreational use

Three trends indicate that EI will likely be maintained: backcountry park use has declined in recent years; interactions between humans and bears have decreased; and the park's wilderness character has been maintained.

The recreational activities proposed in the 2004 management plan with the greatest potential for overall cumulative effects are air access, winter recreation, and trail and route development (Slocombe, Danby and Lenton 2002). Day use has increased in recent years. While recreational use received a green rating, using a precautionary approach, there is a need for ongoing monitoring and management of recreational use, improvements to data collection related to day use and precautions related to air access, winter recreation and trail and route development.

Monitoring of ecological integrity

Ecological monitoring has been carried out in various forms inside the park and in the region for decades. National EI work, data analysis and this report have all contributed to the recognition of the need to refine the existing monitoring program to ensure that it provides appropriate measures for the full range of EI indicators. This includes a review of existing thresholds (e.g., whether thresholds for population increase should be the same as those for population decrease; whether yellow and red thresholds of 90% and 95% are appropriate for ungulates or whether 90% and 99% should be considered) and establishment of new thresholds. The recent hiring of a new monitoring ecologist and a GIS person for the field unit will help with this work, as will ongoing discussions with adjacent land owners and local community members. These efforts, in concert with TK work, should assist with maintaining and improving the park's EI.

12.2 Cultural Resources

Intangible cultural resources

Intangible cultural resources are the rich knowledge of the Southern Tutchone people, who have occupied the park area and region for at least 8,000 years. These resources include oral history, place names, songs and stories, and knowledge of place and ecosystem. They are under serious threat for a variety of reasons, including the aging of Elders and changes in lifestyle leading to less time spent on the land. Locally these threats were exacerbated by the exclusion of First Nations people from the park area for many years. The primary responsibility for these resources and their continuation rests with the local First Nations. Parks Canada assists the CAFN and KFN governments and citizens in this work; renewed ties to the land will help maintain and enhance ecological integrity through the incorporation of TK in decision-making. Various methods are needed to enhance and strengthen intangible cultural resources in Southern Tutchone traditional lands, including the park.

Tangible cultural resources

Research suggests that erosion — through wind and water — will have the greatest impact on archaeological sites in the future. Structural decay and damage from wildfire are also significant threats. The recent outbreak of spruce bark beetle has increased the risk of fire, especially in the southern part of the park, where many archaeological sites are located.

Fire can affect not only exposed wooden elements, such as brush huts or log buildings, but buried resources, by burning through artifact-bearing layers down to mineral soil. Heat from fires can also affect artifacts. Secondary effects include increased erosion in burned-over areas and disturbance of sites through blow-downs of standing dead trees.

Given the sizeable investment of money and personnel required to protect such sites, a significant program of inventory and recording of new and existing sites is important to document resource information and support more informed decision-making.

Cultural resource management

The current (2007/08 to 2011/12) Parks Canada Corporate Plan (Parks Canada Agency 2007a) includes an objective to improve the state of cultural resources in national parks by 2014. Although work has been undertaken on cultural resource management since the park was established, more efforts are needed. The

lack of a statement of cultural resource values means that cultural resource evaluations are incomplete and messaging cannot be fully developed. The lack of an overall cultural resource management strategy, whatever form it might take, also makes it difficult to move ahead in an effective manner. Further identification and recording of archaeological resources is needed to facilitate decision-making and protocols need to be developed with First Nations partners for cultural resource management in the park.

12.3 Public Appreciation and Understanding

Progress has been made in recent years to coordinate and update the park's interpretive and outreach offer materials. At the same time, a reduction in resources has required difficult choices and trade-offs. Four areas raise particular concern: lack of an interpretation and outreach plan; on-site interpretive media; visitor/user satisfaction; and data and research.

Lack of an interpretation and outreach plan

While a range of work has been done over the years related to interpretation and outreach, the lack of an overall plan has left gaps in the program. An on-site interpretation and outreach education plan would provide a solid framework for identifying, understanding and engaging current and potential audiences (local First Nations and communities, visitors, and Canadians); identifying messages (for both natural and cultural heritage); selecting interpretive media and prioritizing investments; and developing an assessment framework and tools.

On-site interpretive media

Much of KNP&R's on-site interpretive media (exhibits, signage and self-guided interpretive trails) as well as the main A/V presentation are old and have outdated messaging. Significant steps are being taken to improve this situation, including a major trailhead signage project and recapitalization of the KNP&R VRC.

One issue that has not been addressed is the disconnect between visitors' rating of the importance of different interpretive media and the type of media provided. Although visitors give self-guided brochure-based and sign-based interpretive tours the highest importance rating (80% and 79%) of various interpretive media, interpretive panels on the park's three self-guided interpretive trails have deteriorated and are no longer current.

Visitor/user satisfaction

Two issues relate to visitor/user satisfaction: availability of interpretation activities and programs for local community members. The interpretation activities available did not meet national targets in the 2005/06 visitor survey. With limited resources, efforts made in recent years have provided interpretive programming with high visitor satisfaction, but current visitors see this offer as insufficient and wish that other products were also available.

In addition, programs available for local community members, who are an important park audience, have had limited success. New methods of engaging locals, based on their interests and motivations, need to be developed and resourced.

Data and research

A lack of data and research is affecting staff's ability to design and deliver programs and products that meet the needs visitor/user groups. It also limits staff members' ability to evaluate results. Several current assessment methods are not comprehensive enough to provide detailed information. There are four areas of particular concern:

- Improvements are needed in the way statistics are collected and visitor numbers are estimated, so that staff can accurately determine the percentage of visitors contacted. In addition, a definition of what constitutes a learning experience for KNP&R needs to be determined.
- In the 2005/06 visitor survey, visitors' understanding of the significance of KNP&R did not meet the national target. While improvements in message delivery may be needed, additional methods of assessing program effectiveness and understanding are also necessary. These methods should include a wider range of visitors/users and provide more in-depth information; the current assessment tool (six knowledge statements) is inadequate.

- A better understanding of audience motivations, needs and expectations (especially those of local community members) is needed, as is more information on potential audiences.
- There is a need to define and monitor ways in which "Canadians, visitors and stakeholders actively support management actions in achieving or maintaining the ecological health of KNP&R."

12.4 Visitor Experience

Four aspects of visitor experience require particular attention: visitor trends; capital assets; sense of welcome; and park trails.

Visitor trends

In recent years there has been a decrease in the number of park visitors, including the park's two VRCs and Kathleen Lake campground; there has also been a decline in overnight backcountry use. Day use, however, is growing. The declines mirror a regional decline in non-resident visitation to the Kluane area. There has also been a decrease in independent visitors and an increase in bus-tour travellers. There are several reasons for this and there is a need to better understand them. Parks staff need to have a better understanding of the interests and motivations of current and potential visitors to inform decision-making related to visitor opportunities, ecological integrity and education.

Capital assets

As is the case with the park's interpretive media, visitor services assets — such as the KNP&R VRC — are generally old, have not been adequately maintained and are in need of recapitalization. In some cases assets are lacking; for example, there are no day-use facilities in the north end of the park. Capital asset planning requires detailed information about current and potential visitor needs and expectations.

Sense of welcome

Visitors do not experience a strong sense of welcome when they arrive at the park. There are no points of entry such as park gates, no park identity signs on the main highways, no orientation exhibits when they approach the park (although an exhibit on the highway from Whitehorse will open soon) and existing highway directional signs are unclear, outdated, unilingual or nonexistent. In addition, there are no orientation exhibits outside the park's two VRCs that are available when the centres are closed. The impact of this lack of welcome is difficult to gauge, but it is a part of a visitor's overall experience of the park. For example, some travellers in the region — particularly those who arrive from the south or west — pass right by the park without ever being aware that it is there.

Park trails

Since the park was established, backcountry wilderness hiking has been a primary focus, attracting visitors from around the world. In recent years, with changes to health and safety codes, and more blow-downs resulting from the outbreak of spruce bark beetle, maintaining the park's 200 km of trails has become more challenging. Ecological integrity issues are also a concern (e.g., sight lines for seeing wildlife, etc.). These problems have been exacerbated by continuing reductions to the maintenance crew. Overnight backcountry use has also been declining in recent years. A more in-depth, integrated examination of the park's trail offer is needed.

12.5 Cooperative Management

Cooperative management of the park was introduced in the mid-1990s as a result of First Nations land claims through the establishment of the KPMB. It has experienced successes and frustrations over the years and continues to evolve.

Common understanding

One clear message from the cooperative management assessment is that there is a lack of a common understanding about what exactly cooperative management is and what it means in practical terms with respect to KNP&R. This lack of clarity leads to confusion and frustration about roles and responsibilities and ensuing priorities and actions. A common understanding would help the cooperative management progress.

Relationships and communication

While interactions among KPMB board members were felt to be positive, there is a need for board members to improve their interactions and relationships with non-board members, including park staff. Board members also need more effective communication with the broader community, to increase awareness of the KPMB and its work.

Credibility

Board members and non-board members interviewed had different opinions of the board's credibility with different groups in the community. While no distinct patterns appeared, it is worth noting that 60% of the board members interviewed perceived the board's credibility with CAFN as poor (for credibility with other groups the "poor" rating was 30%). Frank discussions among the board, CAFN and Parks Canada about CAFN's expectations of the board would be helpful.

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Appendix 1. EI monitoring: potential measures

The park's EI monitoring program is still being developed. Using the National EI Reporting Framework, two workshops with park and service centre staff (March and May, 2006) and a community workshop in Haines Junction (January, 2007) identified a number of priorities for the park's monitoring program (Table 8). These priorities will be further refined and developed to provide the basis of the park's maturing EI monitoring program in the coming years.

Table 8. Priorities for monitoring, KNP&R

	Biodiversity	Ecosystem functions	Stressors
Glaciers and Icefields	• Nunataks – wildlife, insects plants • Require more expertise to determine if other measures are required	• Surface area • Wasting rates	• Pollutants • Climate change
Forests	• Moose • Forest vegetation • Snowshoe hare • Grizzly bear*	• Connectivity • Disturbance /succession • Primary productivity • Forest structure	• Development inside and outside the park • Encroachment of southern species • Human impact • Harvest in/outside the park • Climate change
Tundra	• Dall's sheep • Wolves/wolverines/predators • Vegetation (changes over time) • Grizzly bears* • Goats • Ground squirrels	• Primary productivity • Connectivity • Climate change	• Park visitation • Temperature and precipitation • Animal harvest inside and outside the park
Freshwater (lake and stream/river ecosystems)	Lake • Lakeshore vegetation • Fish communities • Benthic invertebrates • Surface aquatic insects Stream/river • Fish populations and communities • Invertebrate communities • General measures of biodiversity • Benthic invertebrates • River otter	Lake • Water quality • Water levels • Freeze up/break up • Permafrost Stream/river • Hydrology • Water quality • Freeze up/break up • Water temperature	Lake • Sport fishery and harvest • Climate change • Pollutants Stream/river • Pollution • Climate change • Sport fishery and harvest
Wetlands	• Identify wetlands inside the park/sentinel sites • Vegetation/habitat types • Species diversity	• Hydrology • Changes in wetlands (aerial extent) • permafrost • water quality	• Climate change • Harvesting/human use

*monitored in tundra or forest

Appendix 2. Internal assessment of KNP&R's interpretation and outreach program

In 2006, KNP&R staff met to assess the park's public education program. Table 9 summarizes the results of this qualitative internal review.

Table 9. Assessment of KNP&R interpretation and outreach program

Understanding audiences
Strengths • Have a relatively good idea of who the audiences are • Have redirected some resources in the last few years to target school groups, locals and, to some degree, First Nations audiences
Challenges • Further work is required to more precisely define audiences (build on what is in the management plan) • Audiences have not been prioritized based on national and local priorities • Little if any formal information about audience expectations and needs is available • Little if any formal information about level of audience awareness and understanding is available • A better understanding of local and First Nations audiences is needed
Messages
Strengths • Message development done in collaboration with First Nations for discrete projects, such as the current major sign project
Challenges • messages have not been clearly identified for the park, although some initial work was done in the management plan • no interpretation plan has been developed for the park • additional work with First Nations is required to define appropriate cultural stories and messages to be communicated to park visitors and First Nations members
Providing opportunity
Strengths • campfire programs are well attended • a small school outreach program is now in place • culture camps have been hosted in partnership with First Nations • a trailhead and interpretive sign project is underway
Challenges • the number and type of summer programs have been reduced in recent years • on-site school programs linked to curriculum have not yet been developed and resourced • community outreach programs do not attract a broad range of people • special event programs do not draw many people • interpretation is still very reliant on personal programs • interpretive exhibits are outdated, the community newsletter is no longer resourced, and teacher materials are not available • interpretive web content needs to be improved • few programs and products target First Nations and local audiences

Evaluation tools

Strengths

- small qualitative evaluations of school outreach programs have been carried out

Challenges

- interpretive statistics need to be consistently recorded and reported
- appropriate tools are needed to measure learning and interpretive program and product effectiveness

Planning and investment tools

Strengths

- a communication plan has been put in place for the Yukon Field Unit, although it is relatively recent

Challenges

- inadequate staff and resource capacity to achieve the objectives in the management plan
- the park does not have an interpretation plan or a communication plan
- cross-functional education planning is needed in the short term and long term

Extending our reach

Strengths

- a kokanee salmon lesson plan for teachers is being developed
- First Nations staff members are increasing awareness of the park within their First Nations, which is improving relationships with the park

Challenges

- more tools for teachers are needed
- information and materials are needed for guides and outfitters to deliver Parks Canada messages
- few participants have attended KPMB open houses

Appendix 3. Indicators of wilderness character

Table 10. Wilderness management objective: opportunities for solitude and natural quiet
Measured through the 2002 SFU wilderness survey (Haider and McCormick 2004)

Location	Management Plan Target	Actual Mean Reported Encounter Level
Cottonwood Trail	< 4 encounters per day along trail	1.35
Kathleen Lake	< 8.7 encounters with other parties	5.13
Alsek River	< 0.5 encounters per day along river < 1.5 aircraft seen/heard per day	0.61 0.80
Ä'äy Chù (Slims River) Valley	< 5 encounters along trail < 3 encounters at campsites	1.66 1.43
Shàr Ndü/Duke/Dän Zhùr/Donjek	<1 encounter per day at campsites	0.25
Icefields	< 2 encounters per day along routes < 4 encounters per day at base camps < 1.6 aircraft seen/heard along routes < 3.7 aircraft seen/heard at base camps	1.16 2.34 1.47 1.89
Off-highway corridor	< 7.1 encounters per day at trailheads < 6.0 encounters per day along trails	2.05 1.91

Table 11. Wilderness management objective: high-quality wilderness experiences
Measured through the 2002 SFU wilderness survey (Haider and McCormick 2004)

Location	Management Plan Target	Actual % Reporting Near or Total Wilderness Experience
Cottonwood Trail	> 80% of hikers report near or total wilderness experience	96.4%
Kathleen Lake	> 80% of day users report near or total wilderness experience	87.0%
Alsek River	> 85% of rafters report near or total wilderness experience	100.0%
Ä'äy Chù (Slims River) Valley	> 80% of hikers report near or total wilderness experience	98.3%
Icefields	> 90% of mountaineers report near or total wilderness experience	96.2%
Off-highway corridor	> 74% of off-highway travellers report near or total wilderness experience	89.4%

Table 12. Wilderness management objective: pristine campsites with little if any sign of other recreational use
Measured through the 2005/06 SFU campsite monitoring study (Morris 2007)

Location	Management Plan Target	Actual campsite condition class and perceptibility rating
Cottonwood Trail	More than 60% of campsites barely to not perceptible	65% of sites not at all or barely perceptible Average condition class assessment of 6.2, down from 7.6 in 1998
Alsek River	More than 80% of campsites barely to not perceptible More than 80% of campsites have condition class rating of <12	90% of sites not at all or barely perceptible 97.7% of sites (all but one) had rating < 12 Average rating of 2.3 slightly higher than 1998 rating of 2.2
Ä'äy Chù (Slims River) Valley	No more than 1 campsite per trail has condition class rating > 10	West: 1 site with rating of 18 East: 2 sites with rating > 10 Ä'äy Chù – Bullion: 0 sites > 10 Ä'äy Chù – Congdon; 0 sites > 10 Other: 0 sites > 10 Overall average condition class rating of 6.8 lower than 1997 average of 7.2