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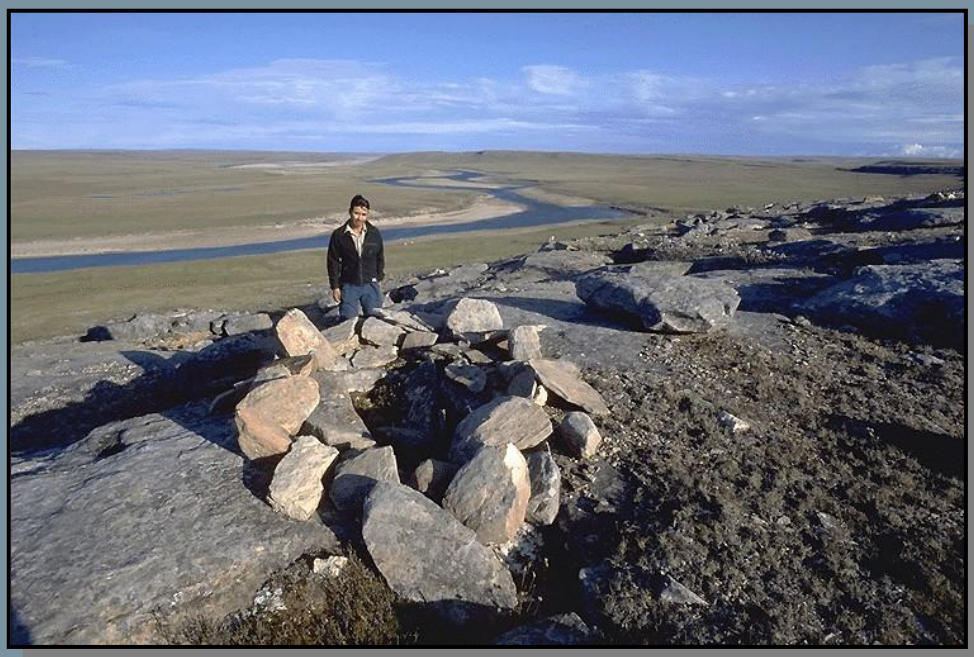

Replacement Class Screening Report for Aircraft Landings in the Northern National Parks of Canada

Aulavik National Park of Canada and Tuktut Nogait National Park of Canada

March 2011

Canada

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Parks Canada Agency
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Acronyms

CEA – Cumulative Effects Assessment

CEAR/The Registry – Canadian Environmental Assessment Registry

COSEWIC - Committee on the Status of Endangered Wildlife in Canada

EA – Environmental Assessment

ESA – Ecologically Sensitive Area

ESS – Ecologically Sensitive Site

FA – Federal Authority

LMU – Land Management Units

RA – Responsible Authority as defined under the *Canadian Environmental Assessment Act*

RCSR – Replacement Class Screening Report

The *Act* – The *Canadian Environmental Assessment Act*

The Agency – The Canadian Environmental Assessment Agency

1. Introduction

This replacement class screening report (RCSR) will address aircraft landing activities for recreation purposes in two northern national parks: Aulavik National Park of Canada and Tuktut Nogait National Park of Canada. These two northern national parks are not accessible by road therefore, in order to participate in recreational activities, helicopters or fixed-wing aircraft must be used to bring visitors to areas of the parks. Since activities described in this report are referred to in the *Inclusion List Regulations* and require the issuance of business licences authorizing aircraft operation and landing for recreational purposes in national parks, an assessment under the *Canadian Environmental Assessment Act (*the *Act)* is required. The class screening process under the *Act* provides an appropriate, efficient, fair, flexible and consistent approach to the environmental assessment of aircraft landings in national parks.

The introduction of this replacement class screening provides the national parks context (1.1), the link to the *Act* (1.2), and the rationale for using the replacement class screening approach (1.3).

1.1. National parks context

National parks are "dedicated to the people of Canada for their benefit, education and enjoyment ... and shall be maintained and made use of so as to leave them unimpaired for the enjoyment of future generations" *(Canada National Parks Act* 2000). This assessment must be conducted in the context of the purposes and policies associated with national parks. Sections 1.1.1 to1.1.4 outline the most relevant legislative and policy requirements for national parks to provide context for the rest of the replacement class screening.

1.1.1. Managing for ecological integrity

The *Canada National Parks Act* section 8(2) identifies the importance of protecting park resources in relation to visitor use by stating "the maintenance or restoration of ecological integrity, through the protection of natural resources and natural processes, shall be the first priority of the Minister when considering all aspects of the management of parks."

The *Canada National Parks Act* section 2(1) states "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."

In operational terms ecosystems can be characterized in terms of composition, structure and process. An ecosystem can be considered to have integrity when native components (plants, animals and other organisms), physical structure (such as habitat connectivity or vegetation patterns) and processes (such as interspecies competition and predation) remain intact and function unimpaired by human activities. Conversely a loss in ecological integrity can be characterized by changes to physical structure, or interference

with ecosystem processes as a result of human activity, that result in a loss of native species biodiversity.

Indicators of, and stressors affecting, ecological integrity as identified in park management plans were reviewed to identify the environmental components most likely to be affected by aircraft landing activities for recreation purposes.

1.1.2. Managing for cultural resources

The protection of cultural resources is a priority for Parks Canada, with the highest obligation being to protect and present those resources of national historic significance in order to retain their historic value and extend their physical life (Canadian Heritage Parks Canada 1994). The protection of cultural resources also involves the consideration of the cumulative impacts of any proposed actions concerning the historic character of cultural resources, the goal being to preserve cultural integrity.

A cultural resource is defined as "a human work, or a place that gives evidence of human activity or has spiritual or cultural meaning, and that has been determined to be of historic value" (Canadian Heritage Parks Canada 1994). Within national parks, cultural resources are inventoried and assigned a value based on the particular qualities and features that make up their historic character. Resources are evaluated for their historical associations, their aesthetic and functional qualities and their relationships to social and physical environments (Canadian Heritage Parks Canada 1994). Cultural resources within the national parks are considered to be potentially sensitive sites for the purposes of the environmental assessment of aircraft landing activities.

1.1.3. Managing for visitor experience

The *Canada National Parks Act* states that "The national parks of Canada are hereby dedicated to the people of Canada for their benefit, education and enjoyment...". To fulfill Parks Canada's mandate of facilitating the education and enjoyment of national parks by the public, a variety of outdoor recreation opportunities are permitted consistent with direction provided by *Parks Canada Guiding Principles and Operational Policies* (Canadian Heritage Parks Canada 1994). Outdoor activities that promote the appreciation of a park's purpose and objectives, and respect the integrity of the ecosystem, are intended to serve visitors of diverse interests, ages, physical capabilities and skills. The private sector and non-governmental organizations are encouraged under park policy to provide skills development programs that will increase visitor understanding, appreciation and enjoyment of the national parks. Individual park management plans specify the types and ranges of both new and existing appropriate outdoor recreation activities and their supporting facilities. Parks Canada, working in cooperation with others, is committed to offering high-quality visitor services by ensuring that park resources do not deteriorate and that quality visitor experiences are not diminished.

1.1.4. Cooperative management

Both of the parks covered by this environmental assessment are cooperatively managed. In Aulavik National Park of Canada (hereafter Aulavik), the Member Organizations have established an Advisory Board as a forum to cooperatively manage the park in accordance with the *Agreement For the Establishment of a National Park on Banks Island* (1992). In Tuktut Nogait National Park of Canada (hereafter Tuktut Nogait), a management board has been established as per *The Tuktut Nogait Agreement* (1996). These agreements provide formal mechanisms for Aboriginal people to be involved in park management. Management boards perform an important role in providing feedback and guidance for management direction. The park establishment agreements affirm aboriginal rights relating to access and harvesting. As a result of these provisions, the use of "visitor" in this report does not refer to Aboriginal people covered by the land claim for that park. Another provision that is common in various agreements is the priority basis for business opportunities in the park to be offered to Aboriginal people first or to have a certain percentage of licences reserved for Aboriginal people (provisions vary; please check the individual agreements for details).

1.2. Class screening and the Canadian Environmental Assessment Act (the Act)

The *Canadian Environmental Assessment Act* and its regulations set out the legislative basis for federal environmental assessments. The legislation ensures that the environmental effects of projects involving the federal government are carefully considered early in project planning. The Act applies to projects which require a federal authority (FA) to make a decision or take an action, whether as a proponent, land administrator, source of funding or regulator (issuance of a permit or licence). The FA then becomes a responsible authority (RA) and is required to ensure that an environmental assessment of the project is carried out prior to making its decision or taking action.

Most projects are assessed under a screening type of assessment. A screening systematically documents the anticipated environmental effects of a proposed project, and determines the need to modify the project plan or recommend further mitigation to eliminate adverse environmental effects or minimize the significance of these effects.

The screening of some repetitive projects may be streamlined through the use of a class screening report. This kind of report presents the accumulated knowledge of the environmental effects of a given type of project and identifies measures that are known to reduce or eliminate any significant adverse environmental effects. The Agency may declare such a report appropriate for use as a class screening after taking into account comments received during a period of public consultation.

A replacement class screening consists of a single report that defines the class of projects and describes the associated environmental effects, design standards and mitigation measures for projects assessed within the report. It includes a determination regarding significance of environmental effects for all projects assessed by the replacement class

screening. Once the Agency declares an RCSR and where a RA is satisfied that a project falls within the class described in the RCSR, no further action is required under sections 18 or 20 of the Act with respect to the project, as long as the RA ensures that design standards and mitigation measures described in the RCSR are implemented.

1.3. Replacement class screening and the candidate class

The RCSR meets the requirements of a class screening as outlined below:

- *Well-defined projects;*

Aircraft landings are a well-defined class of projects. All air service providers (operators) providing aircraft landings associated with recreational activities in a national park require a business licence to operate. The primary activity of these operators under this RCSR is dropping off and picking up visitors and their gear. The activities conducted by operators are limited to management of solid waste, management of human waste, management and handling of fuel, flight and operation of the aircraft including approach and landing. The business licence authorizes aircraft use and landings in a specific national park(s), with most landings occurring at designated locations. In addition to having a business licence, a landing permit is required each time an operator lands in a park.

- *Well-understood environmental settings;*

Aircraft landings take place in well-understood environmental settings within the two national parks included in the RCSR. As most aircraft landings occur in the same locations, the local environmental setting is known (See Section 4).

- *Unlikely to cause significant adverse environmental effects, taking into account mitigation measures;*

Aircraft landings are unlikely to cause significant adverse environmental effects, taking into account mitigation measures. Aircraft operators have experience operating planes in northern national parks. Parks Canada has experience with monitoring the effects of activities associated with aircraft landings and as a result has developed standard mitigation to ensure that significant environmental effects do not occur. Any site-specific variation in environmental effects is well understood and site-specific mitigation measures have been established to address sensitive sites. Given the common characteristics of these activities and minimal impacts after mitigation is implemented, the adverse environmental effects are not likely to be significant.

- *Follow up*

Aircraft landings do not require follow-up because there is no new/unproven mitigation measures, the setting is familiar, and there is no new technology.

- *Effective and efficient planning and decision making;*

Aircraft landings are subject to the management planning process as established by the *Canada National Parks Act*. This process is used to provide management direction for

all activities within a national park and addresses cumulative effects at the park scale. The management plan sets limits or restrictions on aircraft use, if they are necessary to protect ecological integrity or visitor experience. All projects are required to comply with management plan directions and restrictions. Furthermore, these activities take place on federal land administered by Parks Canada and do not require referrals to other Federal Departments for authorization. Also, species at risk, as defined in the *Species at Risk Act*, are not negatively affected by the activities within the RCSR and therefore there are no referrals required.

- *Unlikely to elicit public concern.*

Within the five years that the original RCSR was in effect, concerns have been raised with respect to the potential impact of flights into Tuktut Nogait. This has been in the context of declining caribou populations. This was addressed in 2009 by restricting the timing of all flights into the park. However, it is important to note that this RCSR will only apply when visitor flights are permitted. Thus management decisions that restrict the timing, and possibly the locations, of aircraft landings in any given year in either Tuktut Nogait or Aulavik are beyond the scope and applicability of this report.

Aircraft landings are well suited to the application of the class screening process because of the common characteristics, overlapping geographic and temporal scope, and the generally predictable and mitigable environmental effects.

1.4. Consultation

Consultation was conducted with Federal Departments and Agencies, other environmental assessment regimes, stakeholders and the general public.

1.4.1. Review and comments by Federal Departments and Agencies and other Environmental Assessment Regimes

In the initial development of the document, Transport Canada, Fisheries and Oceans Canada, and Environment Canada (Canadian Wildlife Service) all reviewed a draft of the document. A draft of the RCSR was also provided to the Environmental Impact Screening Committee (established under the Inuvialuit Final Agreement). Comments were incorporated into the final version of the RCSR.

1.4.2. Aboriginal Consultation

In the context of existing Aboriginal and treaty rights of the Aboriginal peoples of Canada, recognized and affirmed in section 35 of the Constitution Act, Parks Canada contends that the projects of the class within the RCSR will not infringe upon potential or established Aboriginal and treaty rights.

The draft Replacement Class Screening Report was provided to the Inuvialuit Environmental Impact Screening Committee (EISC), but they did not have any comments. The RCSR was provided to the EISC a second time as part of the Agency's public consultation period. No comments or questions were raised. In addition, the RCSR was sent to the Wildlife Management Advisory Council (NWT), the Tuktut Nogait

National Park Management Board, the Inuvialuit Game Council, the Fisheries Joint Management Committee, and the Aulavik National Park Site Manager along with a letter requesting comments on the document prior to re-declaration. Comments were received and incorporated from the WMAC (NWT). Parks Canada representatives also attended an Inuvialuit Game Council meeting prepared to discuss the RCSR, although questions were not raised.

1.4.3. Public consultation during development of RCSR

Public consultation took place at two stages during the initial development of the RCSR: consultation conducted by Parks Canada as part of the development of the RCSR, and consultation at the declaration stage conducted by the CEAA. The intent of consultation during the development of the RCSR was to create awareness of the proposed replacement Class Screening process, to offer the opportunity to review the draft RCSR, and to provide comments and suggestions to Parks Canada prior to their submission to the CEAA for declaration. Subsequently, the CEAA offered the public the opportunity to review the proposed RCSR as part of the declaration process.

The stakeholder group considered most likely to have an interest in the class screening process was aircraft operators. Aircraft operators were concerned with the potential for additional restrictions and operational requirements that could be applied as mitigations. As a result of these concerns, additional opportunities for consultation were offered through the RCSR development process to allow for early identification of issues.

Prior to re-declaration of this RCSR, the public was offered an opportunity to review the report. The public was consulted via the Agency's web site, the Canadian Environmental Assessment Registry (the Registry) and the Consulting With Canadians web site. Copies of the RCSR were made available at designated viewing centres to facilitate easy public access of the report.

1.5. Canadian Environmental Assessment Registry

The purpose of the Canadian Environmental Assessment Registry (the Registry) is to facilitate public access to records relating to environmental assessments, and to provide notice in a timely manner. The Registry consists of two components – an Internet site and a project file.

The Registry project file must include a copy of the RCSR. The RA maintains the file, ensures convenient public access, and responds to information requests in a timely manner.

The Registry Internet site is administered by the Agency. The RA and the Agency are required to post specific records to the Internet site in relation to the RCSR.

Upon declaration of the RCSR, the Act requires RAs to post on the Internet site of the Registry, at least every three months, statements of projects for which an

RCSR was used. Each statement should be in the form of a list of projects, and should include:

- the title of each project for which the RCSR was used;
- the location of each project;
- RA contact information (name, phone number, address, email); and
- the date when it was determined that the project falls within the class of projects covered by the report.

Note: The schedule for posting statements is:

- no later than July 15 (for projects assessed from April 1 to June 30)
- no later than October 15 (for projects assessed from July 1 to September 30)
- no later than January 15 (for projects assessed from October 1 to December 31)
- no later than April 15 (for projects assessed from January 1 to March 31)

2. Projects subject to the class screening

The scope of the class screening report includes aircraft landings for recreational activities in two northern national parks: Aulavik and Tuktut Nogait (Figure 1). The aircraft landings include:

- Float plane landings
- Fixed-wing plane landings (skis and wheels)
- Helicopter landings

The following associated activities are included in this project: management of solid waste, management of human waste, management and handling of fuel, flight and operation of aircraft including approach and landing.

2.1. Projects subject to the Act

All businesses providing air access for visitors to national parks for recreational activities require a business licence in accordance with direction provided by section 4.1 of the *National Parks of Canada Businesses Regulations*. Section 13.1 of the *Inclusion List Regulations* under the *Act* defines recreational activities that take place outdoors in a national park, outside of a town or visitor centre, as projects under the *Act.* Aircraft landings are the major part of some recreational activities and enable other recreational activities to take place in these parks. Because a permit is required pursuant to subsection 5.1 of the *National Parks of Canada Businesses Regulations* (included in section 24.1 (Schedule I, Part II) of the *Law List Regulations* under the *Act*), the issuance of this authorization triggers the *Act* and an environmental assessment is required.

2.2. Projects subject to replacement class screening

Projects subject to the RCSR include aircraft landings for recreational purposes in Aulavik and Tuktut Nogait and their associated activities.

Three types of aircraft can operate in these parks: helicopters, fixed-wing floatplanes, and fixed-wing planes with wheels or skis. Typical activities associated with business licences for aircraft landings include the following: management of solid waste, management of human waste, management and handling of fuel, flight and orientation of aircraft, approach and landing.

2.3. Projects that require referrals to federal or territorial departments

As the result of a land claim agreement, an additional environmental assessment regime applies in the two parks included in this RCSR. Tuktut Nogait and Aulavik are within the Inuvialuit Settlement Region. Therefore the "The Western Arctic Claim: The Inuvialuit Final Agreement" (IFA) (Indian and Northern Affairs Canada 1984) applies, which requires an environmental assessment for "every proposed development or consequence to the Inuvialuit Settlement Region that is likely to cause a negative environmental impact" section 13(7). Business licences covered by this RCSR are required to undergo an environmental assessment through the IFA process as well.

2.4. Projects not subject to the RCSR

Any activity not listed in Section 2.2 is not included within the scope of the RCSR and must undergo an individual environmental assessment under the Act. An individual assessment is required if the business licence includes more activities than management of solid waste, management of human waste, management and handling of fuel, flight and operation of aircraft including approach and landing. The RCSR may not be used if Parks Canada feels the proposed project does not fit the intent of the RCSR for routine, easily mitigable projects.

Projects that are not suitable for application of the replacement class screening include those that are likely to have an adversely affect species at risk, either directly or indirectly, such as adversely affecting their habitat, and/or that would require a permit under the *Species at Risk Act (SARA).* For the purposes of this document, species at risk include:

- species identified on the List of Wildlife Species at Risk set out in Schedule 1 of SARA, and the critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) of SARA.
- species that have been recognized as "at risk" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or by provincial or territorial authorities.

Proposed physical activities that have been previously assessed either under the *Act* or under the *Federal Environmental Assessment and Review Process Guidelines Order* may be exempted from further environmental assessment in accordance with conditions of section 13.1 of the *Inclusion List Regulations*.

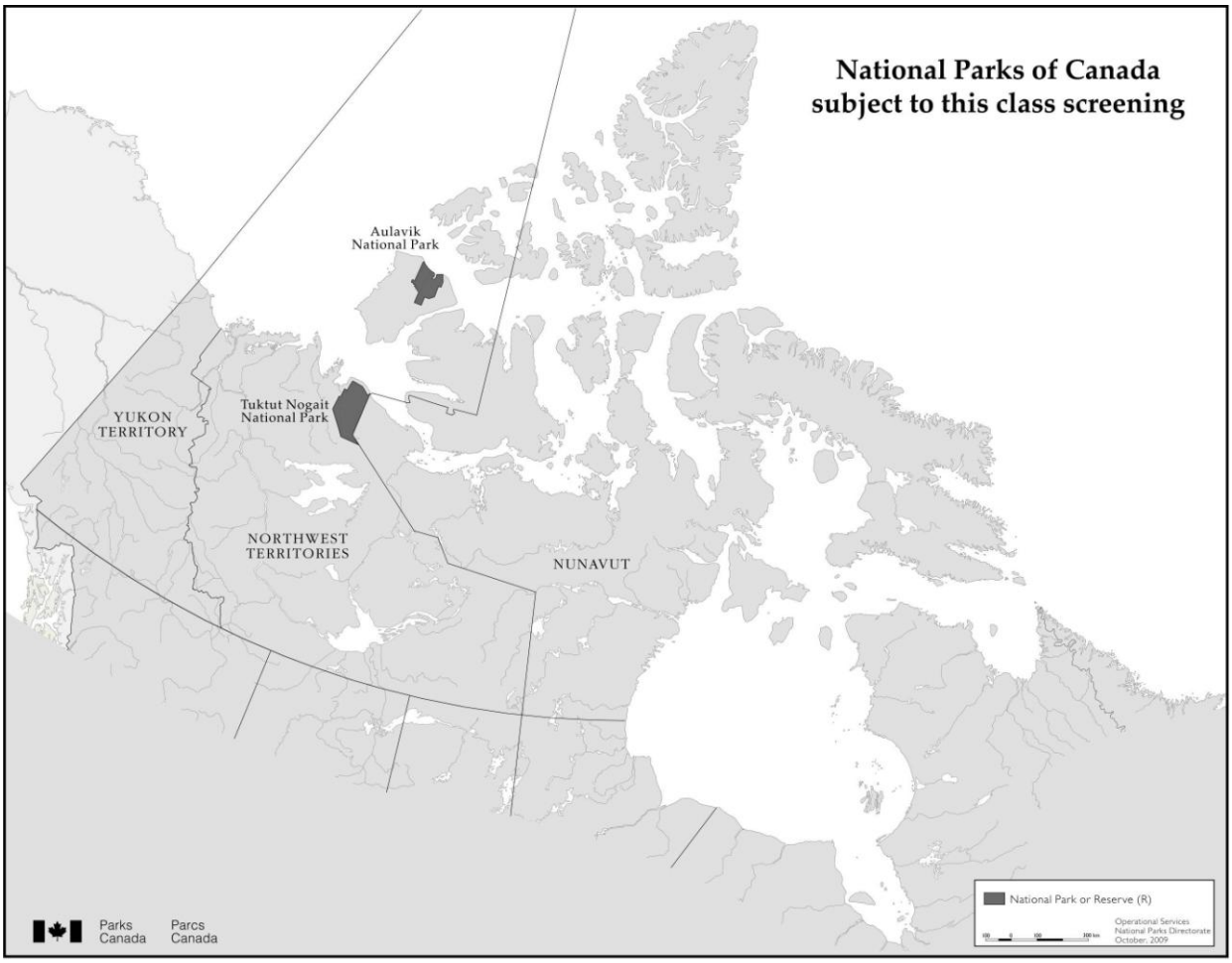

Figure 1. Location Map

3. Project description

None of the parks covered by this RCSR have road access. As a result, air access is the primary means of access to the parks. Aircraft access has been used in all of these parks since their creation (Aulavik in 1992 and Tuktut Nogait in 1996).

Three types of aircraft can operate in these parks: helicopters, fixed-wing floatplanes, and fixed-wing planes with wheels or skis. Typical activities associated with business licences for aircraft landings include the following: management of solid waste, management of human waste, management and handling of fuel, flight and orientation of aircraft, approach and landing. The geographical scope of the activities is limited to Aulavik National Park of Canada and Tuktut Nogait National Park of Canada (Figure 1). Some components of the environment may be affected beyond park boundaries; therefore those components will be assessed at larger scales as described in Section 5.3. All associated activities conducted under business licences for aircraft landings for recreational purposes in these parks will be assessed under this class screening.

Management of solid waste

Garbage can be produced from activities inside the aircraft on route to the park or immediately outside the aircraft. Typical garbage would be packaging around food products.

Management of human waste

Passengers or pilots may need to defecate and/or urinate while on the ground in the park. In most cases there are no washroom facilities at the landing site. Limited soil in arctic environments, slow decomposition rates in the north and the concentration of people around landing sites make this an important concern.

Management and handling of fuel

At times it will be necessary to transport fuel into the park. Refuelling of aircraft is often necessary in Aulavik which involves transporting 45 gallon drums by air to designated fuel cache locations. Most fuel is used in the same season it is cached, with a small number of drums being stored for up to two years. Empty drums are removed at the end of each season or at the earliest opportunity when space on aircraft is available. (see Appendix B). Tuktut Nogait does not have designated fuel cache locations; however the fuel cache protocol does apply in the event that the Superintendent designates temporary cache locations.

Flight and operation of the aircraft

This activity involves running the aircraft engine and flight over the park. Aircraft operations are under the jurisdiction of Transport Canada and all applicable regulations must be followed. In addition, a recommendation is made in the Transport Canada Aeronautical Information Manual that flights be at least 2000 ft above national parks.

Approach and landing

This activity involves the aircraft descending to a lower altitude to approach the landing area or take-off from the landing area. It also involves landing on water with a floatplane or landing on land for helicopters and fixed-wing aircraft with wheels or skis. Other typical activities on the ground could include unloading/loading gear and people, walking around and having lunch. Aircraft, including helicopters, are not allowed to land in Zone 1 areas as designated in park management plans. In Aulavik, fixed-wing aircraft land at five designated landing sites. In Tuktut Nogait, fixed-wing aircraft are allowed to land on any water body.

Aircraft landing areas on land are typically:

- Well drained, and not susceptible to erosion;
- Level, smooth and firm;
- Not covered with thick vegetation;
- At least 250m in length (for fixed wings); and
- Near hiking/water sites of interest (Elliot and Elliot 1978).

Typically fewer than 20 aircraft landings for visitor use occur in each park each year.

3.1. Typical seasonal scheduling and duration of projects

Due to the extreme weather and seasonal nature of visitation to the northern national parks, aircraft landings are generally between March and November, with the majority in the summer months. Aircraft landings operations usually involve minimal amounts of time on the ground. In some cases, the aircraft drops people off and then leaves while they participate in the recreational activities. In other cases, the aircraft may wait for up to several hours while visitors explore the site.

3.2. Effects of the environment on the project

Reduced visibility due to cloud, snow and dust, extreme winds, icing conditions, storms, and unstable landing areas (shallow or short water landing areas, icefalls, and rock falls) could all affect the ability of the aircraft operator to implement the mitigation and to fly and land safely. Accidental aircraft landings are possible as a result of the effects of the environment and the environmental effects analysis will be addressed as accidents and malfunctions in Section 4.4.

4. Environmental effects assessment

4.1. Land use and management in the national parks

An understanding of the land use and management system in the national parks is fundamental to the analysis and evaluation of environmental impacts. The discussion on land use and management in the northern national parks is divided into discussions on Aboriginal land use, national park zoning and visitor use of the parks.

4.1.1. Aboriginal land use

Under the land claim agreement and the park establishment agreements with authority in Aulavik and Tuktut Nogait, Aboriginal people are given access to the parks for traditional activities (see individual agreements for details). Traditional activities can include travel, camping, gathering, hunting and trapping. In some cases these activities take place near areas used by visitors. Informal communication between Aboriginal groups and park staff is used to try to minimize the number of conflicts between visitors and traditional users. References to "visitors" within this environmental assessment do not refer to Aboriginal peoples.

4.1.2. National park zoning system

The national parks zoning system is an integrated approach to the classification of land and water areas in the national parks. Areas are classified according to the need to protect the ecosystem and the parks' cultural resources. The capability and suitability of areas in terms of providing visitor-use opportunities is also a consideration in making decisions about zoning.

The zoning system generally addresses the appropriate types and intensity of visitor use in a given area and should be considered in the assessment and management of aircraft landing activities. In addition to five zoning categories, Parks Canada policy provides for the designation of Culturally and Environmentally Sensitive Areas (Canadian Heritage Parks Canada 1994).

Zone I – Special Preservation
Zone I lands deserve special preservation because they contain unique, threatened, or endangered natural or cultural features and are excellent examples of representative natural regions. Aircraft access is not permitted in these small areas.

Zone II – Wilderness
Zone II contains extensive areas that are good representations of a natural region and are conserved in a wilderness state. The perpetuation of ecosystems with minimal human interference is the key consideration. Motorized access is not permitted, although strictly controlled air access to remote areas may be permitted.

Zone III – Natural Environment
In Zone III areas, visitors experience the park's natural and cultural heritage through outdoor recreational activities that require minimal services and facilities of a rustic nature.

Zone IV – Outdoor Recreation
Zone IV accommodates a broad range of opportunities for understanding, appreciation and enjoyment of the park's heritage. Direct access by motorized vehicles is permitted. Zone IV generally includes front country facilities and the rights-of-way along park roads. Zone IV nodes also exist at various locations with intensive tourism and recreation facility development such as campgrounds, visitor centers and day use areas.

Zone V – Park Services
Zone V is for park communities such as Banff and Jasper and major service or park administrative centres.

Culturally and Environmentally Sensitive Areas
The Culturally Sensitive Areas (CSA) or Environmentally Sensitive Areas (ESA) designation applies to areas with significant and sensitive features that require special protection. Sensitive Area designation is useful for focusing and communicating objectives for research, protection and visitor experience for particular areas.

Land within Tuktut Nogait has not yet been zoned. In Aulavik, all land is currently Zone II – Wilderness, and includes three Culturally Sensitive Areas. All designated landing areas in Aulavik are well away from the Culturally Sensitive Areas.

4.1.3. Visitor use

The northern parks covered by this RCSR do not have a lot of visitation (Table 1). The primary visitor activity in Aulavik and Tuktut Nogait is canoeing and kayaking. There are also opportunities for hiking trips.

Table 1. Total number of landing permits and visitors for Aulavik National Park and Tuktut Nogait National Park (2004/05 – 2008/09).

	Aulavik		**Tuktut Nogait**	
Year	Landing Permits	Visitors	Landing Permits	Visitors
2004-2005	8	36	3	11
2005-2006	7	80	5	57
2006-2007	2	25	4	23
2007-2008	4	5	1	12
2008-2009	6	39	2	13

4.2. Description of natural and cultural resources

The description of natural and cultural resources is divided into vegetation and soil, wildlife, aquatic resources and cultural resources. Within each of these categories the discussion will be separated by park.

4.2.1. Vegetation and soil

Aulavik and Tuktut Nogait include land from within the Southern Arctic and Northern Arctic ecoregions. The parks will be described individually based on the description of the ecoregion they fall within. The descriptions of ecoregions are taken from *A National Ecological Framework for Canada* (Ecological Stratification Working Group 1996). No vegetation species at risk have been identified in these parks; however no comprehensive field studies have been conducted.

4.2.1.1. Aulavik

Aulavik is found in the Banks Island Lowland ecoregion. Moss with low growing herbs and shrubs such as purple saxifrage, *Dryas spp.*, arctic willow, kobresia, sedge and arctic poppy is the main vegetation cover. Turbic Cryosols soils cover hills of glacial deposits. The permafrost is deep and continuous with high ice content. Wetlands include fens, elevated peat mound bogs and marshes along the coast.

4.2.1.2. Tuktut Nogait

Tuktut Nogait is found in the Coronation Hills and Bluenose Lake Plain ecoregions. Dwarf birch, willow, northern Labrador tea, *Dryas spp.*, and *Vaccinium spp.* form an almost continuous vegetation cover. Warmer sites can have tall dwarf birch, willow and alder and wetter sites have willow and sedges. Continuous permafrost with medium ice content underlies the area. Organic Cryosols and Turbic Cryosols cover undulating glacial tills, fluvioglacial and marine deposits.

4.2.2. Wildlife

Wildlife in both Aulavik and Tuktut Nogait can be harvested by Aboriginal people for subsistence use. The regulation of these activities and the management of wildlife populations is the responsibility of cooperative management boards established under land claim agreements. The Wildlife Management Advisory Council and Fisheries Joint Management Committee have these responsibilities for Aulavik and Tuktut Nogait. The boards work cooperatively with hunters and trappers committees, the territorial government, other federal departments and Parks Canada.

The birds and mammals will be described for each park. Species at risk are found in each park and identified in the following sections.

4.2.2.1. Aulavik

Aulavik is home to a large population of muskox that has grown exponentially in the latter part of the 20th century but now appears to be declining. A 2010 survey of Banks Island put the non-calf muskox population at 36,676, down from 47,209 in 2005. Peary caribou during this same period have shown a sharp decline in population then stabilizing with an estimate of 1,057 adults in 2010. The Banks Island population of Peary caribou has been assessed as endangered and included on Schedule 2 of *SARA*. Visitors to the Thomsen River corridor commonly see arctic wolves. Other common mammal species include lemmings, arctic fox, and arctic hare. The only mammal species of special concern in Aulavik is the polar bear on Schedule 3 of *SARA*.

As with mammals, bird species in Aulavik may be limited in diversity but high in density. There are a total of 43 known species recorded for Aulavik of which only the raven and the ptarmigan are year-round residents. The most significant bird population is lesser snow geese. The largest concentration of lesser snow geese in the Western Arctic breeds and moults in the area. The Thomsen River and Castel Bay area was created as a

bird sanctuary for protection in 1961 (Grayhound Information Services 1997). Other common species include: loons, gulls, Brant geese, sandhill cranes, ptarmigan, and Lapland longspur. The only bird species of special concern in Aulavik is the peregrine falcon (*Falco peregrinus tundrius*), Schedule 3 of *SARA.*

4.2.2.2. Tuktut Nogait

Tuktut Nogait was created to protect the calving grounds of the Bluenose-West herd of barren ground caribou. A 2009 population estimate of the herd is 17,900 animals, a drastic decline from the 112,000 non-calf animals estimated in 1992. The Bluenose-East caribou herd is also thought to use habitats in the southern area of the park and areas immediately east of the park. This herd has also declined in recent years, and was estimated at 66,750 non-calf animals in 2006, down from close to 120,000 in 2000. Wolverine, grizzly bear, fox, lemming, and voles are also common to the park.

There are 74 known bird species for Tuktut Nogait with a wide variety of waterfowl, shorebirds, raptors, and songbirds. The Park is known for concentrations of raptor nesting habitat along the canyon and cliff walls. Species of special concern on Schedule 3 of *SARA* in Tuktut Nogait include the grizzly bear, wolverine, short-eared owl and peregrine falcon (*Falco peregrinus tundrius*).

4.2.3. Aquatic resources

The boundaries of Aulavik contain salt-water bays and other marine components. Marine mammals, anadromous fish and marine fish live in these waters. Several species of seals are found in Aulavik.

Fresh water resources are limited in many of the parks due to low precipitation and permafrost that prevent groundwater storage. Ponding and imperfect drainage are common in areas such as the Arctic Coastal Plain of Aulavik and Tuktut Nogait. Rivers and streams are often fed by snowmelt and therefore have the largest volume in the spring and can vary dramatically in volume.

Growth rates and sexual maturity of northern fish populations are often retarded due to short growing season and low nutrient levels. However, seasonal abundance of insects and low metabolic requirements can create an older population of large fish. There is limited diversity of species although there can be large concentrations of resources in specific habitats. Important habitat types include estuaries, aufeis areas, fish holes, and deep lakes. Areas of fish congregation are often also areas of local concern for traditional use and continued success of migratory populations.

The fourhorn sculpin found in Aulavik is a species of special concern on Schedule 3 of SARA. Specific aquatic sites commonly used for aircraft landings will be described in Section 4.2.5.

4.2.4. Cultural resources

The cultural resources in these parks include large features such as cabins, tent rings, and caches, and smaller, more fragile elements such as graves, artefact scatters, and animal butchery sites. However, known cultural resource sites are not located within the immediate vicinity of the designated landing sites described in Section 4.2.5.

4.2.5. Site specific

In Aulavik and Tuktut Nogait, designated landing sites will be the most commonly used areas for landing. As a result, each of these designated landing sites will be further described below. For each of the sites it is indicated whether the site is used by fixed-wing aircraft landing on land or water. Helicopters can land at any of the sites described below.

Aulavik
All of the landing sites in Aulavik are for helicopters or for fixed-wing aircraft with wheels or skis. There is little species specific information known about these sites.

South Boundary Landing Site, latitude 73°00'46"N, longitude 119°37'52"W
This site has tundra vegetation on till. Ponding is common in the area.

Polar Bear Cabin, latitude 74°08'30"N, longitude 119°59'25"W
This site is a gravel terrace with sparse vegetation. It has been heavily impacted due to operations that pre-date park establishment.

Muskox River Junction with Thomsen, latitude 73°49'05"N, longitude 119°51'58"W
This site is on the gravel of river shoreline below the high water mark. There is sparse vegetation.

Castel Bay, latitude 74°04'55"N, longitude 119°46'00"W
This site is located on a river island. Tundra vegetation covers well-drained soils.

Green Cabin, latitude 73°13'49"N, longitude 119°32'17"W
This site has tundra vegetation on till. Ponding is common in the area.

Thomsen River 10 km south of Castel Bay, latitude 73°59'01"N, longitude 119°42'43"W
The site is on a river island. Tundra vegetation covers well-drained soils.

Tuktut Nogait
All fixed-wing aircraft landing locations in Tuktut Nogait are on the water and are accessed by floatplanes. The following waterbodies are used for aircraft landings:

Canoe Lake, latitude 67°58'32"N, longitude 121°29'46"W (outside the park but in an area that will become part of the park)

Brock Lake, latitude 69°27'27"N, longitude 121°40'25"W

Hornaday Lake, latitude 68°43'11"N, longitude 120°44'28"W

Cache Lake, latitude 68°52'20"N, longitude 122°55'02"W (raptors nest in this area)

Long Lake, latitude 68°22'16"N, longitude 122°49'11"W

Seven Island Lake, latitude 69°17'06"N, longitude 123°00'32"W

Shoreline effects or other impacts have not been noted at any of these locations. Other water bodies can also be used for landing. These landing sites are presently seeing only occasional use and are rarely visited each year.

4.3. Valued ecosystem components and boundaries

The environmental assessment of aircraft landings is based on the factors outlined in section 16(1) of the *Act*. However, in order to focus the assessment, valued ecosystem components (VECs) were selected. Park management plans are developed with extensive consultation and describe indicators of ecological integrity and an ecological vision of the park for the future. These indicators and ecological vision indicate that wildlife, vegetation/soils, water quality, and air quality are valued for their contributions to the maintenance of ecological integrity in all of the northern parks covered by the RCSR. As described below, each of these also has the potential to be affected by the aircraft landing activities. In addition to the ecological VECs, cultural resources, Aboriginal land use, and visitor experience will be considered as described below.

Vegetation and soils

Land-based fixed-wing aircraft landings cause soil compaction and associated changes to the vegetative cover. Foot traffic from people on the ground may also impact soils and vegetation cover, especially in wet or sensitive areas. These impacts are local in nature and their extent depends upon the soil or non-soil being directly affected. There are no known vegetation species at risk in the areas affected by this class screening. Vegetation and soils will be assessed within the park boundaries.

Wildlife

Aircraft noise has the potential to displace wildlife and can have a negative impact on wildlife behaviour. Waste could attract wildlife, and changes to water quality may decrease habitat quality for wildlife. Effects to wildlife will be assessed at the population scale which can include wildlife beyond park boundaries.

Water quality

The activities covered by the RCSR are not expected to have direct impacts on aquatic species. However, water quality could be impacted by pollution from garbage, human waste, erosion from aircraft landings, or fuel spills. Impacts to water quality may result

in subsequent impacts to aquatic wildlife and vegetation species. Large effects to water quality could move beyond park boundaries. These effects would only occur in the case of a large accident, a very rare occurrence.

Air quality
Aircraft operation involves the release of emissions that reduces air quality. Air quality could be affected beyond the park boundary; therefore effects will be assessed in the global context.

Cultural resources
Parks Canada policy states that "Parks Canada will assess effects on cultural resources whether or not they flow from bio-physical effects" (Parks Canada 1998). To address the Act's requirements and Parks Canada policies, direct and indirect impacts to cultural resources will be assessed. Aircraft landing and the actions of site visitors can adversely affect cultural resources.

Aboriginal land use
Traditional activities are protected by land claims and are supported within these national parks. Aircraft landing could directly or indirectly affect Aboriginal land use if visitors interfere with wildlife populations or habitat.

Visitor experience
As described in Section 1.1.3, Parks Canada has a mandate to facilitate the education and enjoyment of the parks by the public. To address this mandate, direct impacts to visitor experience will be assessed in addition to indirect impacts caused as a result of changes in the environment. Aircraft over flights could disturb the wilderness experience of visitors within national park boundaries. However, since the two northern parks covered by this environmental assessment have very low visitation rates, it is likely that aircraft landings will increase visitation rates, having an overall positive effect on visitor experience.

4.4. Analysis of effects and mitigation

Mitigation was identified based on an analysis of the interaction of the project activities with environmental components. Potential impacts and mitigations were identified through searches of literature and best practices in other areas. Parks Canada staff in the field units and Parks Canada guidance documents provided further mitigation. Site-specific mitigation has been identified for areas sensitive to aircraft over flights and landing locations. The mitigation identified within the RCSR will be consistent with the management plans, human use strategies and any other appropriate guiding documents.

Table 2 identifies potential environmental effects of project activities. For each of the project activities the environmental effects identified in Table 2 are described below. Mitigation is identified to minimize environmental effects.

4.4.1. Management of solid waste

Improperly managed solid waste can attract wildlife; contaminate vegetation, soil and water when it decomposes; and, diminish the experience for visitors, and Aboriginal people using the land.

4.4.1.1. Environmental effects

Wildlife attraction
Improperly managed solid waste is an attractant to wildlife. Wildlife could become conditioned to human garbage, altering their behaviour, movement patterns and natural feeding habits. Wildlife that receive food rewards are potential threats to public safety (black bears, grizzly bears and polar bears) and may need to be relocated or destroyed.

Contamination of vegetation, soil and water
The decomposition of garbage on the soil or in the water could release toxic chemicals that would be harmful.

Diminished visitor experience and Aboriginal land use experience
The presence of garbage can detract from the wilderness experience visitors seek in these parks. Similarly, Aboriginal land use experience could be diminished. Litter in an Arctic environment does not biodegrade readily and may be visible for several years. The problem could increase if visitor use increases.

Table 2. Potential environmental effects of project activities.

	Project Activities					
VEC	**Management of solid waste**	**Management of human waste**	**Management and handling of fuel**	**Flight and operation of the Aircraft**	**Approach and landing**	**Accidents/Malfunctions**
Wildlife	Wildlife Attraction	Negative secondary impacts on wildlife health	Contamination	Wildlife disturbance	Wildlife disturbance	Wildlife destruction or damage from fuel spill or aircraft accident
Vegetation and Soil	Contamination		Contamination		Soil compaction, soil erosion, damage/ destruction of vegetation	Vegetation destruction or damage and soil contamination from fuel spill or aircraft accident
Water Quality	Contamination	Contamination	Contamination			Contamination from fuel spill or aircraft accident
Air Quality				Global air pollution and global warming; Local reduction in air quality.		
Cultural Resources		Digging pit privies may disturb cultural resources			Damage/ removal of cultural resources	Cultural resources damage or destruction from fuel spill or aircraft accident.
Aboriginal Land Use	Decreased quality of land use experience	Decreased quality of land use experience	Decreased quality of land use experience due to aesthetics of fuel caches or spills	Reduced hunt success; Decreased quality of land use experience.	Decreased quality of land use experience	Aboriginal land use experience could be diminished by a fuel spill.
Visitor Experience	Diminished Visitor Experience	Diminished Visitor Experience	Decreased visitor experience due to aesthetics of fuel caches or spills	Reduced wilderness experience & loud; Positive experience from viewing the park from aircraft	Decreased and increased visitor experience	Visitor experience could be diminished by a fuel spill.

4.4.1.2. Mitigation

Operators shall:

- Remove all solid waste brought into the park on the same trip as it was brought in.
- Refrain from burning solid waste as this is not allowed.

4.4.2. Management of human waste

If human waste is not properly disposed of, water quality can be negatively affected and the experience of visitors and Aboriginal people on the land can be diminished.

4.4.2.1. Environmental effects

Contamination of water quality (including disease distribution) and secondary impacts on human health, aquatic species, and land wildlife
Potential impacts of human waste on water quality can be chemical and bacteriological. They may include impacts to water clarity, water quality, aquatic species populations and distribution, and habitat change (Parks Canada 2002b). Sources for drinking water and human waste disposal are concerns as they can impact both human health and the environment. There are also potential impacts to aquatic species such as fish, amphibians, birds and mammals that use the aquatic environment as a food source.

Drinking water can be contaminated directly or from runoff from human feces, which may carry bacteria, giardia, hepatitis and other diseases. Bacterial action is much slower in the arctic and human waste can take a long time to decompose. This is especially true where permafrost is just below the surface. With few trees in northern national parks, visitors often seek privacy in small drainages to deposit human waste. Since drainages are more likely to collect water, water quality is more likely to be affected.

Diminished visitor experience and Aboriginal land use experience
Improperly disposed human waste detracts from visitor experience and Aboriginal land use experience if in obvious locations and/or large quantities.

4.4.2.2. Mitigation

The following mitigations are taken from the draft *Human Waste Guidelines – Western Arctic Field Unit* (Parks Canada 2010). All users of Aulavik and Tuktut Nogait are challenged to pack out their solid human waste wherever feasible. Numerous commercially available waste disposal products exist that offer portable, low cost options for safe, lightweight means to collect, transport and dispose of human waste. Pilots/operators must carry garbage bags, a small spade and hand wipes for this purpose.

Where it is not feasible to pack out solid human waste, users are asked to observe the following practices:

- Encourage clients to use washrooms before boarding the aircraft.
- Defecate at least 50 metres away from aircraft landing areas, campsites, trails and freshwater sources.

- Leave faeces exposed on tundra or bury in a shallow hole of no deeper than 15 cm. Cover faeces with material excavated from hole.
- South facing sites may accelerate decomposition and are preferred sites for defecation.
- If travelling along a body of salt water, it is acceptable to deposit faeces in a shallow pit below the high water mark.
- Pack out toilet paper when possible. Very small amounts may be ignited if in a controlled environment.

Users are not required to pack out urine; however, introduction of human urine into freshwater sources must be minimized. Users are asked to observe the following practices:

- Urinate at least 50 meters away from the aircraft landing site, travel routes, camping areas and freshwater sources.
- Rocky or gravely sites may reduce attraction from wild animals and are preferred sites for urination.
- Pack out toilet paper when possible. Very small amounts may be ignited if in a controlled environment.

If collecting solid human waste for appropriate disposal outside of national parks, urinate separately before defecation wherever possible. Urine adds significant weight and volume to waste accumulations for disposal.

4.4.3. Management and handling of fuel

Improperly managed fuel can contaminate soil, water and wildlife. Refuelling of aircraft is allowed in Aulavik and may be allowed in Tuktut Nogait under special circumstances.

4.4.3.1. Environmental effects

Contamination of soil, water or wildlife

Occasionally it is necessary to store fuel drums in the park for refuelling of aircraft. Spills from refuelling, transporting the fuel or the operation of the floatplanes would negatively affect the environment. The fuel drums may also leak. The effects of small amounts of fuel or other toxic substances on the environment can be dramatic. For example, ingestion of oil and oil products by caribou can cause abnormal physiological conditions (Thurlow and Associates Environmental Control Consultants 1984). Petroleum products degrade slowly in the arctic and as a result, animals and plants are exposed to the contaminant for longer. Spills in an arctic environment take longer to degrade due to reduced biological action, snow cover, and limited energy input for evaporation. The effects of spills in the water can be severe for aquatic animals, and waterfowl (Resources Wildlife and Economic Development 1998). In addition, some pollutants spilled from aircraft landing on or near to water could melt or wash into waterbodies.

4.4.3.2. Mitigation

Operators shall be in compliance with the Fuel Caching Protocol for National Parks in the Western Arctic. (Appendix B)

4.4.4. Flight and operation of the aircraft

The operation of aircraft can negatively affect air through global air pollution, global warming, and reducing local air quality. Aircraft over flights can negatively affect wildlife by disturbing them. Aboriginal hunt success could be reduced if aircraft over flights frightened target wildlife. Aircraft over flights can also diminish the experience of visitors and Aboriginal people on the land.

4.4.4.1. Environmental effects

Global air pollution and global warming

Aircraft engines emit carbon monoxide, nitrogen oxides, volatile organic compounds, and unburnt hydrocarbons during flying, landing and take-off. These gases contribute to air pollution problems such as acid rain. Combustion gases such as carbon monoxide, water vapour, nitrogen oxides and methane are greenhouse gases that contribute to climate change (Nicell and Cornish 1996). There is growing evidence that climate change may already be affecting the arctic. For example, ice thickness and cover has been shown to decrease over the past couple of decades (Mitchell 2000). Impacts on the arctic could include: longer growing season, longer ice-free season, increased erosion due to permafrost thaw, and reduction of habitat suitable for cold climate species (Cohen 1997). The contribution of aircraft flying visitors into northern national parks towards the global problems of acid rain and climate change is minute due to the relatively small number of flights conducted within northern national parks.

Wildlife disturbance by aircraft noise

The general effects of aircraft noise on wildlife species are summarized. Unless otherwise specified this information is taken from a technical report for the *Environmental Impact Statement On Military Flying Activities in Labrador and Quebec* titled *A Review of the Literature Pertaining to the Effects of Noise and Other Disturbance on Wildlife* (Renewable Resources Consulting Services Limited 1994). No research was found on the effects of noise on fish or other aquatic organisms.

Research on the effects of aircraft noise on wildlife is still relatively rare. In some cases, the effects of other noises on animals must be extrapolated to estimate the effects of aircraft noise. Research specifically on the effects of aircraft is often focused on short term responses and not long term population responses, which are the ultimate concern. Research indicates that wildlife are affected by noise in three ways, physiologically, behaviourally and socially.

Physiologically, an animal's ability to hear can be affected, particularly after repeated exposure. The physiological effects of the startle and stress of an aircraft over flight include activation of neural and endocrine systems which may change the blood flow patterns and hormone levels. Hormonal changes may also be caused by the noise.

Behavioural responses to aircraft include escape responses and avoidance responses. Escape responses can occur because of a sudden exposure to the loud sound of an aircraft. Increased energy expenditures and a higher probability of accidents/death are associated with the escape response. Wildlife can also avoid the noise by reducing or abandoning the use of an area close to the source of noise. When wildlife are forced from these areas, they may have to live in marginal habitat, overpopulate the remaining habitat, or be at risk of higher predation. In some cases, wildlife are able to habituate to the noise and continue to live near the noise.

Communication with other individuals is often an important part of social behaviour. For example, locating a mate and advertising a territory are activities that may rely on auditory communication. Furthermore, hearing is important to be able to detect predators or prey quickly. Interruption of communication may ultimately lead to decreased population sizes through decreased reproductive success or increased predation.

These physiological, behavioural and social effects of aircraft noise on wildlife can be intensified based on several factors. First, the type of sound influences an animal's response. The characteristics of sound that are most important when evaluating the effects on wildlife are the duration, intensity, frequency and the speed of the onset of the sound. Second, the acoustic sensitivity of animals influences the degree to which they are affected. If acoustic communication is very important or they are very sensitive and more easily startled, a species may be more affected. In general, mammals have a higher sensitivity to noise than birds. Third, there may be seasonal changes in sensitivity. Often animals are more sensitive when breeding or migrating or expending high energy (lactating or gestating). Fourth, animals in aggregations may be more sensitive. If one animal reacts, the whole group may react. Being in a group, they may have an increased probability of injuries as a result of escape responses. Fifth, other pressures on the populations may increase the sensitivity of the animal to an additional stress. For example, if the population is already subject to high predation or low food supplies, aircraft disturbance may be more likely to harm individuals or the population. Finally, harassment of animals instead of simple over flights impacts the response of animals to aircraft in general. If animals are harassed by aircraft they are less likely to habituate to the noise.

Aboriginal hunt success reduced

Local Aboriginal people use some parks for hunting and trapping. Aircraft noise may affect the actual hunt for animals by scaring them away. Furthermore, any effects on wildlife that change their behaviour, distribution or abundance would also affect the local hunters and trappers.

Reduced quality of Aboriginal land use experience

Aboriginal people may be disturbed or annoyed by aircraft noise.

Reduced visitor wilderness experience and quiet

Aircraft flying overhead can decrease the wilderness experience of visitors. In a survey of backcountry users of Tonquin Valley in Jasper National Park, visitors ranked "quiet, peace" as the second highest reason for their visit. When asked about the effect of encountering Parks Canada staff, dogs, horseback riders, aircraft or hikers on the trail, only aircraft failed to enhance their experience (on average people encountered aircraft twice in their trip) (McVetty 1998). Visitors to remote northern Canadian national parks are seeking a "wilderness" experience. The presence of aircraft can interfere with their enjoyment of the "wilderness". However, since aircraft are the only practical means of access to some of these parks there may be a higher level of acceptance amongst visitors who have been required to use aircraft themselves. Visitors in the aircraft get a unique perspective on the park and are able to appreciate the beauty and vastness from above.

4.4.4.2. Mitigation

The following actions will mitigate the impacts of aircraft noise and disturbance on wildlife and Aboriginal hunt success. The following mitigations will also minimize impacts on Aboriginal land use experience and visitor experience by decreasing the amount of noise.

Operators shall:

- Minimize use of fuel and emissions by reducing the time the aircraft runs on the ground, minimizing the number of flights, and minimizing the amount of time circling before landing.
- Ensure certification of noise compliance, if applicable, is current.
- Educate visitors about current and appropriate behaviour of aircraft to wildlife.
- Provide visitors with information about the park that is consistent with Parks Canada messages.
- Never circle, chase, hover over, dive bomb, pursue or in any other way harass wildlife. Aircraft landing permits are not to be used for wildlife viewing or photography. Do not alter the flight path to approach wildlife, avoid flying directly over animals. For passengers requesting photographic opportunities, pilots should explain that disturbance of wildlife could result in loss of business licence or charges under the CNPA.
- Avoid congregations of animals.
- Maintain a normal flying altitude of 2000 ft when in the air space over the park except for approach to land, take-off or for safety reasons.
- Maintain an altitude of 3500 ft above bird sanctuaries and areas with bird concentrations (colonies or moulting areas).
- Minimize the number of flights whenever possible.
- Where possible, fly at times when few birds are present (e.g., early spring, late fall, winter).
- Avoid large concentrations of birds (e.g. breeding colonies, moulting areas).
- Avoid especially sensitive areas such as seabird colonies and raptor nesting sites.
- Plan routes that minimize flights over habitats likely to have birds.
- Use small aircraft rather than large aircraft whenever possible.
- Use fixed-wing aircraft rather than helicopters whenever possible.

- Inform pilots of these recommendations and areas known to have birds.
- Hovering or circling may greatly increase disturbance and must be avoided.
- Caribou calving grounds should be avoided whenever possible.
- Animals reactions will depend on a variety of situations including aircraft type, noise levels, speed of travel, over flight frequency, and animal activity (e.g., loafing, feeding, traveling) and its surroundings (water depth and clarity, substrate).

Further guidance on flying altitudes for the Inuvialuit region can be found in the Inuvialuit Environmental Impact Screening Committee Flight Guidelines.

4.4.5. Approach and landing

The environmental effects on wildlife of aircraft approaching and landing are similar to over flights, but intensified. Soil may be compacted or eroded and vegetation may be damaged or destroyed at the landing site. Cultural resources could be disturbed or damaged at the landing site. Visitor experience and Aboriginal land use experience near the landing site could be diminished. Visitor experience for passengers on the aircraft would increase with the access to a remote area.

4.4.5.1. Environmental effects

Disturbance of wildlife

The effects of aircraft noise on wildlife described in Section 4.3.4.1 are more likely to occur in the areas where the aircraft approaches the landing area and takes off because aircraft are at a lower altitude and are noisier. Wildlife on or near the landing area at the time would be disturbed and may leave the area. If the animal is nesting or denning in the area, disturbances by aircraft landings could cause den/nest abandonment. Landing near wildlife may also result in human-wildlife conflict. If human life is in danger, the animal may have to be destroyed.

Soil compaction

Aircraft landings, float planes running up on shore, movement of equipment and the people associated with these events may compact the soil and/or destroy vegetation. For example, Elliot and Elliot (1978) reported that tire tracks in Auyuittuq National Park from five years earlier were still visible in the vegetation, although the vegetation was not dead or torn up. Effects may be more severe immediately after rain when the soil is softer (Elliot and Elliot 1978). In the north these activities affect the permafrost and can cause further damage. Compaction of permafrost soil changes the way the soil transfers heat. As a result, the active layer becomes deeper in the summer and cold temperatures can penetrate deeper in the winter. If water from the deep thawing is able to drain away, the ground surface can be permanently altered. If drainage is impeded, ponding may develop. Landing areas adjacent to slopes may hasten erosion, soil creep or mass wasting. The intensity of the impact also varies based on the terrain conditions such as slope, aspect, soil material, vegetation and the moisture or ice content of the ground (Heginbottom 1973).

Damage/destruction of vegetation
Small areas of vegetation may be damaged or destroyed when aircraft land or by people walking around. Frequently used or maintained landing strips may have minimal vegetation (see Section 5.2.5) to be damaged when aircraft land. Vegetation around waterways with float planes landing may be damaged, but only in limited areas. Pedestrian traffic could impact vegetation if repeated in the same area.

Soil erosion
Wave action caused by floatplanes could cause shore erosion. Erosion around the shore may impact cultural resources. Waterways were important areas for people in the past and so evidence of their presence needs to be protected. Erosion can also lead to increased turbidity in the water and/or deposits on the bottom, which can affect aquatic organisms. The increase in human use and trampling at the shoreline may also have localized erosive effects, especially if operators chose the same location repeatedly. Erosion can also occur on softer landing strips (Elliot and Elliot 1978).

Damage or removal of cultural resources and context
Cultural resources could be affected by soil compacting activities. Often cultural resources are near landing sites since the same natural linear features that provide good landing strips, such as beach ridges, eskers and Aeolian features, are also good locations to find prehistoric or historic travel or camping sites.

In northern climates where soil accumulates slowly, archaeological remains are often on, or near, the surface. Aircraft tires can rut the soil and thereby remove artefacts from their context. Also, when float planes run-up on shore to unload, they can potentially disturb archaeological sites. Airstrips surfaced with sand or gravel fill may contain cultural resources (Gary Adams, pers. comm.), although these have already been removed from their original context. Finally, heavy equipment can compact or destroy artefacts or sites simply by driving over them, and obviously damage also occurs when this equipment is used to excavate undisturbed soil (Stephen Savauge, pers. comm.). Artefacts exposed on the surface also are at risk of being scavenged by human or animal visitors.

4.4.5.2. Mitigation

Operators shall:

- Obtain an aircraft access permit to allow for all aircraft landings.
- As part of a pre-trip briefing, ensure that all clients are aware of National Parks regulations on picking or removing vegetation. Clients should be briefed on travel procedures including potential impacts to vegetation and soils prior to departure.
- Request that clients check for and remove any bur-like seedpods or mud from boots, clothing and pets and dispose in garbage containers prior to departure to reduce risk of new weed infestations.
- Ensure people gathering around the aircraft choose locations on the most durable surfaces whenever possible. Rock, talus, gravel, sand, and gravel stream bottoms are considered to be the most durable surfaces.

- Not make markers, cairns or inuksuks; never blaze trees or otherwise damage vegetation to mark a site.
- Report the discovery of an artefact or cultural site to Parks Canada – do not remove or otherwise disturb the site.
- Not remove or disturb any rocks from any features that look – even remotely – like an archaeological site. These sites include cairns, tent rings, fox traps and food caches and are almost indiscernible to the untrained eye.
- Not land in Zone 1 areas.
- Manage speed, approach distance, rate of descent to minimize noise to wildlife, visitors and Aboriginal people using the land.
- If wildlife are on the landing area, abort the landing or wait until they are well away from the landing area. Aircraft must never be used to move or push wildlife away from the landing area.
- Use tundra tires if required by landing permit.
- Take special considerations to avoid human-wildlife conflict.

4.5. Accidents and malfunctions

Accidents and malfunctions could endanger the aircraft or cause fuel spills. Aircraft flight and landings have some risk of malfunction or action that could cause a crash. The location of the crash would influence the environmental effects, but they could include destruction of vegetation, soil compaction, destruction of wildlife, pollution of soil and water, diminished Aboriginal land use experience and diminished visitor experience. The probability of an aircraft accident is very low because regulatory measures under Transport Canada's authority are designed to ensure aircraft safety. Aircraft safety is of primary importance; therefore, in the event that aircraft safety is threatened, all decisions will be based primarily on safety.

Accidents could occur during refuelling. Accidents during refuelling could contaminate soil, vegetation and water. Wildlife could also be contaminated or damaged. Visitor and Aboriginal land use experience could also be diminished by the presence of a fuel spill. The company operating the aircraft in the park should have an emergency response plan for accidental spills. Operators should be aware of who to contact in an emergency and who will respond with appropriate environmental protection measures. There should also be materials for clean-up readily available as described in Section 4.4.3.2.

4.6. Analysis and prediction of significance of residual environmental effects

Responsible Authorities are required to make a decision on the significance of adverse environmental effects (after mitigation) of a proposed project pursuant to section 20 of the *Act*. A determination of the significance of effects is required for all VECs identified in Section 4.3.

Significant adverse environmental impacts to ecological integrity are considered to be those likely to threaten the continued existence of native species or biological communities. The significance of adverse impacts to cultural resources is evaluated in terms of risk to the integrity and context of the site in consultation with Parks Canada cultural resources experts. Potential impacts to the use of cultural resources or impacts to related functions of other governments, communities or Aboriginal peoples will also be considered. (National Historic Sites Directorate et al. 1993). The significance of adverse impacts to Aboriginal land use will be evaluated in terms of potential effects to harvest success rates and traditional use experience. Adverse impacts to visitor experience are evaluated in terms of potential effects to visitor satisfaction.

The criteria of magnitude, geographic extent, duration, frequency, reversibility and ecological context will be used to evaluate the significance of environmental impacts (Table 3).

Positive residual effects from aircraft landings in northern national parks include the education and increased respect for environmental and cultural resources that clients gain from the aircraft operator. Visitors may also experience new activities in new locations that they would not have been able to otherwise.

Given the regulatory measures already put in place by Transport Canada (for reducing the potential for accidents) and the experience of aircraft pilots, it is highly unlikely that aircraft operations will result in accidents that will have significant effects on ecological or cultural resources or on visitor safety and experience.

Table 3: Significance Criteria Description

	Rating		
Criterion	**Negligible**	**Minor**	**Considerable**
Magnitude	Effect results in disturbance	Effect results in damage	Effect results in destruction
Geographic Extent	Effect is limited to the activity footprint and adjacent areas	Effect is likely to have impacts at an ecosystem scale	Effect is likely to have impacts at a regional scale
Duration of Activity	Minutes to hours	Days to weeks	Months or longer
Frequency	Effects occur on a monthly basis or less	Effects occur on a weekly basis	Effects occur on a daily basis or more often
Reversibility	Effects are reversible over a short period of time without active management	Effects are reversible with active management over a short period of time; or if active management is not possible, effects are reversible over a season	Effects are reversible with active management over an extended period of time; or if active management is not possible, effects are permanent
Ecological Context	Areas other than Ecologically Sensitive Sites and Zone 1 Areas	Ecologically Sensitive Sites (see 4.1.2 for definition)	Zone 1 Areas (see 4.1.2 for definition)

The criteria of magnitude, geographic extent, duration, frequency, reversibility and ecological context will be used to evaluate the significance of potential adverse environmental effects (see Table 3 for definitions). The evaluation of each of these criteria and their ecological context are discussed below. Each VEC will be evaluated for the significance of residual effects after mitigation, and the results are summarized in Table 4.

Soils and vegetation

Although aircraft landings could destroy some vegetation and cause some soil compaction, the area affected will be very small. Any secondary impacts or impacts to rare plants are highly unlikely. The risk of soil contamination is relatively low and, if it occurred would impact a small geographic area. Frequently used or maintained landing areas will have very few additional impacts to vegetation and soil. Given the implementation of standard mitigation measures, aircraft landings are not likely to threaten the existence of native vegetation populations and as a result not likely to result in significant impacts to native vegetation.

Wildlife
Impacts to wildlife are expected to be of short duration, small magnitude and highly reversible. A limited number of landing areas may have more frequent landings, but the use of minimum flight altitudes will minimize the wildlife disturbed by aircraft. Implementation of the mitigation measures for the management of solid waste and human waste will minimize the likelihood of wildlife attraction and habituation. Similarly, the mitigation measures will minimize the risk of contamination and negative effects on wildlife health. Although some vulnerable species populations exist in this area, there is no evidence that aircraft over flights and landings would contribute to their decline. The aircraft landing operations are not likely to threaten the continued existence of any wildlife species in any location in the parks; therefore the impacts are not likely to be significant.

Water quality
Effects to water quality are expected to be of very small magnitude and geographic extent. Given the implementation of standard mitigation measures, it is not expected that the impacts of aircraft landings will have any measurable residual effects on water quality. As a result, secondary impacts to aquatic species are also unlikely.

Air quality
Effects on air quality will be of very small magnitude and frequency. Given the implementation of standard mitigation measures, it is not expected that the impacts of aircraft landings will result in residual effects to air quality.

Cultural resources
Aircraft landings occur on very small areas of designated land, minimizing the potential for impacts to cultural resources. Aircraft landings on water will not affect cultural resources. Given the implementation of standard mitigation measures, it is not expected that the impacts of aircraft landings will result in residual effects on the integrity or context of cultural resources or sites.

Aboriginal land use
Aircraft use is restricted geographically and occurs for a short duration. Given the implementation of the standard mitigation measures, it is not expected that the wildlife or vegetation populations or traditional harvest will be affected.

Visitor experience
Aircraft use is restricted geographically and occurs for a short duration. Given the implementation of standard mitigation measures, the impacts of aircraft landings are not likely to cause significant adverse impacts to levels of visitor satisfaction.

Table 4. Evaluation of the significance of adverse residual effects on VECs after consideration of cumulative effects.

VEC	Aspect	Geographic Extent	Duration	Frequency	Reversibility	Magnitude	Ecological Context	Significance
Vegetation & Soils	Contamination	Neg.	Neg.	Neg.	Con.	Minor	Neg.	Not Significant
	Soil erosion/ compaction	Neg.	Neg.	Neg. to Minor	Neg. to Con.	Neg. to Con.	Neg.	Not Significant
	Vegetation destruction/ damage	Neg.	Neg.	Neg. to Minor	Neg.	Neg. to Con.	Neg.	Not Significant
Wildlife	Attraction	Neg.	Neg.	Neg. to Minor	Neg.	Neg.	Neg.	Not Significant
	Contamination	Neg.	Neg.	Neg.	Neg. to Con.	Neg.	Neg.	Not Significant
	Disturbance	Neg.	Neg.	Neg.	Neg.	Neg. to Minor	Neg.	Not Significant
Water Quality	Contamination	Neg.	Neg.	Neg. to Minor	Neg.	Neg.	Neg.	Not Significant
Air Quality	Air pollution and global warming	Neg.	Neg.	Neg. To Minor	Neg.	Neg.	Neg.	Not Significant
Cultural Resources	Damage or removal	Neg.	Neg.	Neg.	Con.	Neg.	Neg.	Not Significant
Aboriginal Land Use	Diminished experience	Neg.	Neg.	Neg. to Con.	Neg.	Neg.	Neg.	Not Significant
	Reduced hunting success	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.	Not Significant
Visitor Experience	Diminished experience	Neg.	Neg.	Neg. to Minor	N/A	Neg.	Neg.	Not Significant

[a] Neg. means negligible.
[b] N/A means not applicable.
[c] Con. means considerable.

4.7. Cumulative effects analysis

In order for cumulative effects to be possible, there must be residual effects on a VEC. No residual effects were identified on water quality, air quality and cultural resources (see Table 4); therefore no analysis of cumulative effects is necessary for these VECs.

Cumulative effects may result from multiple projects covered by this RCSR and/or the interaction of projects covered by this RCSR and other past, present and future projects inside or outside of a park. In national parks, management plans are the most important tool for managing cumulative effects. Management plans are developed for each park and

reviewed every five years in order to fulfill the mandates for ecological integrity, cultural resources and visitor experience. These documents are tabled in Parliament and contain "a long-term ecological vision for the park, a set of ecological integrity objectives and indicators and provisions for resource protection and restoration, zoning, visitor use, public awareness and performance evaluation" *Canada National Parks Act* section 11(1). Management plans provide the direction for all activities within the park by stating what uses are appropriate in the park, restrictions on use to protect ecological integrity and messages and experiences for visitors. Restrictions on flight and landing locations and/or number of licences or flights approved for specific areas could be identified as part of the management planning process to address cumulative impacts. A strategic environmental assessment is conducted for each of the management plans to ensure cumulative effects are not considered significant.

The cumulative effects on soils and vegetation, wildlife, Aboriginal land use and visitor use will be analyzed below in the context of the direction provided by management plans.

Soils and vegetation

Minimal residual effects on vegetation and soil may occur, but past, present and future aircraft landings are the only projects in the geographic area of the landing areas that could cumulatively impact soil and vegetation. All aircraft landings, with a few exceptions, occur in areas identified in the Schedule of the *National Parks Aircraft Access Regulations* for the *Canada National Parks Act*. These sites are described in Section 4.2.5 and are on durable substrates that have been able to withstand all past and future aircraft landings. Occasional landings at other locations are not likely to cause cumulative effects because they are unlikely to be at the same locations. With the implementation of the mitigation measures in the RCSR and the management plans, the adverse cumulative environmental effects on soils and vegetation are not expected to be significant.

Wildlife

The analysis of cumulative effects on wildlife will be organized based on the type of projects in and around each park.

Projects in and around the parks affecting wildlife include: aircraft landings under the RCSR, visitor activities, research activities and Aboriginal land use. As described by the introduction to Section 4.2.2, wildlife are managed cooperatively by external agencies who ensure that harvest by Aboriginal people is sustainable. As described in Table 1, the visitor use of these parks is very low. Park management plans identify any mitigation necessary to prevent adverse cumulative environmental effects of visitors and researchers.

Therefore, aircraft landing operations are not likely to threaten the continued existence of any wildlife species in any location in the parks; therefore the adverse cumulative environmental effects are not significant. Since there are no expected significant adverse cumulative environmental effects on wildlife, there will be no significant adverse cumulative environmental effects on Aboriginal hunt success.

Aboriginal land use
Multiple aircraft landing business licences under this RCSR could cumulatively decrease Aboriginal land use experience. Visitor use in the parks may also contribute to decreased Aboriginal land use experience. As described in Table 1 most parks have very low visitation making conflicts with visitors and decreased Aboriginal land use experience very unlikely. As described in Section 1.1.4 each of the parks is managed cooperatively with Aboriginal groups who address this issue as necessary. Furthermore, park management plans, developed with Aboriginal groups, identify appropriate activities, appropriate locations for activities and approaches to minimize conflicts between Aboriginal land use, aircraft and visitors. With the implementation of the mitigation measures in the RCSR and the management plans, aircraft landings are not likely to have significant adverse cumulative environmental effects on Aboriginal land use.

Visitor experience
Multiple aircraft landing business licences under this RCSR could cumulatively decrease visitor experience. Aboriginal land use in the parks may also contribute to decreased visitor experience. As described in Section 1.1.4, each of the parks is managed cooperatively with Aboriginal groups who address conflicts between visitors and Aboriginal groups as necessary. Furthermore, park management plans, developed with Aboriginal groups, identify appropriate activities, appropriate locations for activities and approaches to minimize conflicts between Aboriginal land use, aircraft and visitors. As described in Table 1, both parks have very low visitation making decreased visitor experience due to overcrowding or encounters with Aboriginal people unlikely. With the implementation of the mitigation measures in the RCSR and the management plans, aircraft landings are not likely to have significant adverse cumulative environmental effects on visitor experience.

5. Roles and responsibilities

Parks Canada is the sole responsible authority involved in the RCSR. Federal authorities are Environment Canada, Transport Canada and Department of Fisheries and Oceans. The other environmental assessment regime in the RCSR area is under the Inuvialuit Final Agreement.

5.1. Responsible authorities

It should be noted that since the RA is Parks Canada, the RCSR can be applied, where appropriate, by Parks Canada until such time as the Agency declares the RCSR not to be a class screening report or the declaration period expires.

It will be the responsibility of Parks Canada to:

- ensure that projects are properly identified as class-applicable;
- ensure that applicable mitigation is implemented;
- place a regular statement on the Registry Internet site describing the extent to which the RCSR has been used, as identified in section 1.5;
- maintain the Registry project file, ensure convenient public access, and respond to information requests in a timely manner; and

- provide annual confirmation of the continuing validity of cumulative effects assessment conditions to the Agency.

Parks Canada will be responsible for determining whether a project fits within the class. Parks Canada will be responsible for recording the number of assessments conducted under the RCSR and updating the CEAR as described in Section 1.5. Parks Canada will provide a list of the mitigation required under the RCSR to the business licence applicant. The mitigation is repeated in Appendix A and organized for easy distribution to business licence applicants. Business licence applicants will be given all the general mitigation and the mitigation for the specific parks they are operating in. They will be responsible for implementing the described mitigation. Parks Canada will be responsible for reviewing and amending the report as described in Section 6.

Parks Canada is the sole responsible authority for aircraft landing in National Parks of Canada and is the sole authority for enforcement of the *Canada National Parks Act*. Under the *Species at Risk Act* (*SARA*) the Minister of Environment is responsible for all species at risk in national protected heritage areas administered by Parks Canada including national parks and national historic sites.

5.2. Federal authorities

Transport Canada is a Federal Authority because of their jurisdiction over aircraft operations in Canada as a result they reviewed the RCSR during the preparation of the document. Environment Canada is a Federal Authority because of their interest in migratory birds and the bird sanctuaries in two of the national parks. Also the Minister of Environment is a competent minister for *SARA*.

5.3. Coordination with other EA regimes

Tuktut Nogait and Aulavik are within the Inuvialuit Settlement Area, where *The Western Arctic Claim: The Inuvialuit Final Agreement* (IFA) (Indian and Northern Affairs Canada 1984) requires an environmental assessment for "every proposed development or consequence to the Inuvialuit Settlement Region that is likely to cause a negative environmental impact" section 13(7).

6. Procedures for Revising the Replacement Class Screening Report

The RA will notify the Agency in writing of its interest to revise the RCSR as per the terms and conditions of the declaration. It will discuss the proposed revisions with the Agency and affected federal government departments and may invite comment from stakeholders on the proposed changes. For a re-declaration of the RCSR, a public consultation period will be required. The RA will then submit the proposed revisions to the Agency, along with a statement providing a rationale for each revision proposed, as well as a request that the Agency amend or re-declare the RCSR.

6.1. Amendments

The purpose of an amendment is to allow for minor modifications to the RCSR after experience has been gained with its operation. Amendments do not require public consultation and do not allow for changes to the term of application. In general, amendments to the RCSR can be made if the Agency is satisfied that the changes:

- represent editorial changes intended to clarify or improve the document and procedures screening process;
- streamline or modify the planning process; and/or
- do not materially alter either the scope of the projects subject to the RCSR or the factors to be considered in the assessment required for these projects.

6.2. Re-declaration

The purpose of a re-declaration is to allow substantial changes to the RCSR after experience has been gained with its operation. Re-declarations require a public consultation period. A re-declaration of an RCSR may be undertaken for the remaining balance of the original declaration period or for a new declaration period if the changes:

- extend the application of the RCSR to projects or environmental settings that were not previously included, but are similar or related to projects included in the class definition;
- represent modifications to the scope of the projects subject to the RCSR or the factors to be considered in the assessment required for these projects;
- reflect new or changed regulatory requirements, policies or standards;
- introduce new design standards and mitigation measures;
- modify the federal coordination notification procedures;
- extend the application of the RCSR to RA(s) who are(were) not previously declared users of the report;
- remove projects that are no longer suitable for the class; and/or
- extend the term of application of the RCSR.

6.3. Term of application

The term of the Class Screening will be for 10 years, until 2021. However, as part of the management plan review for each individual park, the Class Screening process will be reviewed and amended as required. The coordination of the park management plan review and the review of the Class Screening process will provide the policy and human use strategy context for managing aircraft landings over the subsequent ten-year period.

This report will be in effect for 10 years from its date of declaration. Near the end of the RCSR declaration period, and at other times as necessary, PCA will review content and usage to allow for report updates and the preparation for potential re-declaration.

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Appendix A

Activity-Specific and Site-Specific Mitigation Summary

All operators will be given the general mitigation in Section 1. In addition they will be given the mitigation specific to the park(s) they will be operating in found in Section 2. Mitigation for the management and handling of fuel has been included in the park specific mitigation because this activity is only permitted in Aulavik. This mitigation is the same mitigation identified in the main document, but organized for easier distribution to operators.

1. General Mitigation for both Parks

1.1 Management of solid waste

Operators shall:

- Remove all solid waste brought into the park on the same trip as it was brought in.
- Refrain from burning solid waste as this is not allowed.

1.2 Flight and operation of aircraft

Operators shall:

- Minimize use of fuel and emissions by reducing the time the aircraft runs on the ground, minimizing the number of flights, and minimizing the amount of time circling before landing.
- Ensure certification of noise compliance, if applicable, is current.
- Educate visitors about current and appropriate behaviour of aircraft to wildlife.
- Provide visitors with information about the park that is consistent with Parks Canada messages.
- Never circle, chase, hover over, dive bomb, pursue or in any other way harass wildlife. Aircraft landing permits are not to be used for wildlife viewing or photography. Do not alter the flight path to approach wildlife, avoid flying directly over animals. For passengers requesting photographic opportunities, pilots should explain that disturbance of wildlife could result in loss of business licence or charges under the CNPA.
- Avoid congregations of animals.
- Maintain a normal flying altitude of 2000 feet when in the air space over the park except for approach to land, take-off or for safety reasons.

- Maintain an altitude of 3500 ft above bird sanctuaries and areas with bird concentrations (colonies or moulting areas).

1.3 Approach and landing

Operators shall:

- As part of a pre-trip briefing, ensure that all clients are aware of National Parks regulations on picking or removing vegetation. Clients should be briefed on travel procedures including potential impacts to vegetation and soils prior to departure.
- Request that clients check for and remove any bur-like seedpods or mud from boots, clothing and pets and dispose in garbage containers prior to departure to reduce risk of new weed infestations.
- Ensure people gathering around the aircraft choose locations on the most durable surfaces whenever possible. Rock, talus, gravel, sand, and gravel stream bottoms are considered to be the most durable surfaces.
- Not make markers, cairns or inuksuks; never blaze trees or otherwise damage vegetation to mark a site.
- Report the discovery of an artefact or cultural site to Parks Canada – do not remove or otherwise disturb the site.
- Not remove or disturb any rocks from any features that look – even remotely – like an archaeological site. These sites include cairns, tent rings, fox traps and food caches and almost indiscernible to the untrained eye.
- Not land in Zone 1 areas.
- Manage speed, approach distance, rate of descent to minimize noise to wildlife, visitors and Aboriginal people using the land.
- If wildlife are on the landing area, not land until they are well away from the airstrip.
- Use tundra tires if required by landing permit.

2. Park Specific Mitigation

2.1 Aulavik National Park of Canada

Management of human waste
The following mitigations are taken from the draft *Human Waste Guidelines – Western Arctic Field Unit* (Parks Canada 2010). All users of Aulavik National Park are challenged to pack out their solid human waste wherever feasible. Numerous commercially available waste disposal products exist that offer portable, low cost options for safe, lightweight means to collect, transport and dispose of human waste.

Where it is not feasible to pack out solid human waste, users are asked to observe the following practices:

- Encourage clients to use washrooms before boarding the aircraft.

- Defecate at least 50 metres away from aircraft landing areas, campsites, trails and freshwater sources.
- Leave faeces exposed on tundra or bury in a shallow hole of no deeper than 15 cm. Cover faeces with material excavated from hole.
- South facing sites may accelerate decomposition and are preferred sites for defecation.
- If travelling along a body of salt water, it is acceptable to deposit faeces in a shallow pit below the high water mark.
- Pack out toilet paper when possible. Very small amounts may be ignited if in a controlled environment.

Users are not required to pack out urine; however, introduction of human urine into freshwater sources must be minimized. Users are asked to observe the following practices:

- Urinate at least 50 metres from aircraft landing areas, campsites, trails and freshwater sources.
- Rocky or gravely sites may reduce attraction from wild animals and are preferred sites for urination
- Pack out toilet paper when possible. Very small amounts may be ignited if in a controlled environment.

If collecting solid human waste for appropriate disposal outside of national parks, urinate separately before defecation wherever possible. Urine adds significant weight and volume to waste accumulations for disposal.

Large Groups

Groups planning on utilizing the same location for more than 20 person days may be required to pack out all solid human waste. For example, a group of 4 persons camped at one location for 2 days would equal 8 [4x2] person days. A group of 5 persons planning on using a base camp for 7 days would equal 35 [5x7] person days. Large groups or those intending on utilizing a base camp are asked to contact the Western Arctic Field Unit for additional direction.

Snow

Guides shall ensure that groups move well off main trails or landing areas for bathroom breaks. Latrine areas should be located in sites not likely to be traveled through by others, well away from water bodies and buried deeply when leaving.

Management and handling of fuel

Operators shall:

- Ensure absorbent material is available to soak up any small spills during refuelling.
- Use a hand nozzle with a trigger to minimize spillage when refuelling.
- Use an environmentally safe fuel purge system to keep fuels in the aircraft.
- Pilots must be trained in monitoring drums and detecting leaks.

- Pilots must be trained in emergency spill response procedures and materials for spill containment must be available.

2.2 Tuktut Nogait National Park of Canada

Management of human waste
The following mitigations are taken from the draft *Human Waste Guidelines – Western Arctic Field Unit* (Parks Canada 2010). All users of Tuktut Nogait National Park are challenged to pack out their solid human waste wherever feasible. Today, numerous commercially available waste disposal products exist that offer portable, low cost options for safe, lightweight means to collect, transport and dispose of human waste.

Where it is not feasible to pack out solid human waste, users are asked to observe the following practices:

- Encourage clients to use washrooms before boarding the aircraft.
- Defecate well away from campsites and trails, and at least 50 metres from freshwater sources.
- Leave faeces exposed on tundra or bury in a shallow hole of no deeper than 15 cm. Cover faeces with material excavated from hole.
- South facing sites may accelerate decomposition and are preferred sites for defecation.
- Pack out toilet paper when possible. Very small amounts may be ignited if in a controlled environment.

Users are not required to pack out urine; however, introduction of human urine into freshwater sources must be minimized. Users are asked to observe the following practices:

- Urinate at least 50 metres from aircraft landing areas, campsites, trails and freshwater sources.
- Rocky or gravely sites may reduce attraction from wild animals and are preferred sites for urination
- Pack out toilet paper when possible. Very small amounts may be ignited if in a controlled environment.

If collecting solid human waste for appropriate disposal outside of national parks, urinate separately before defecation wherever possible. Urine adds significant weight and volume to waste accumulations for disposal.

Large Groups

Groups planning on utilizing the same location for more than 20 person days may be required to pack out all solid human waste. For example, a group of 4 persons camped at one location for 2 days would equal 8 [4x2] person days. A group of 5 persons planning on using a base camp for 7 days would equal 35 [5x7] person days. Large groups or those intending on utilizing a base camp are asked to contact the Western Arctic Field Unit for additional direction.

Snow

Guides shall ensure that groups move well off main trail or landing area for bathroom breaks. Latrine areas should be located in sites not likely to be traveled through by others, well away from water bodies and buried deeply when leaving.

Appendix B

Fuel Caching Protocol for National Parks in the Western Arctic

Western Arctic Field Unit

Parks Canada Agency

Inuvik, Northwest Territories

April, 2006

1.0 Introduction

For many years Parks Canada and its partner agencies have been storing fuel drums at various cache sites located within the national parks of the Western Arctic Field Unit in support of various projects as well as regular and emergency operations. Due to the remoteness of these protected areas, the storage of fuel at caches within the Western Arctic Field Unit is necessary for the continuance of park management programs and operations led by this Agency and our partners. Parks Canada – Western Arctic Field Unit has expended considerable resources over recent years in an effort to clean up fuel caches, orphaned barrels and spills at various sites in the field unit. At present there are no regulations related to the storage of fuel drums in small quantities in wilderness areas. In response, Parks Canada is addressing these issues through the implementation of the current Fuel Caching Protocol for the National Parks of the Western Arctic (April, 2006). The protocol will provide Parks Canada, partner agencies, and aircraft charter operators who provide support with instructions to follow when planning projects and/or operations that require fuel caching on national park lands. It will promote best practices in fuel management such as inventory control, secondary containment, and spill response capacity. This document is intended to be a working document that will grow and evolve over time ensuring the protection of the ecological and cultural integrity of our national parks as well as contributing to the safe use and enjoyment of these national treasures by visitors for generations to come.

2.0 Scope

This document applies to the storage of fuel drums on lands administered by Parks Canada in the Western Arctic Field Unit, and supplements any applicable landowner requirements for fuel stored by the Agency on lands administered under other jurisdictions. The protocol identifies the minimum standards that will be required in order to cache fuel within the following national parks and landmark: Ivvavik National Park, Aulavik National Park, Tuktut Nogait National Park and the Pingo Canadian Landmark (Figure 1).

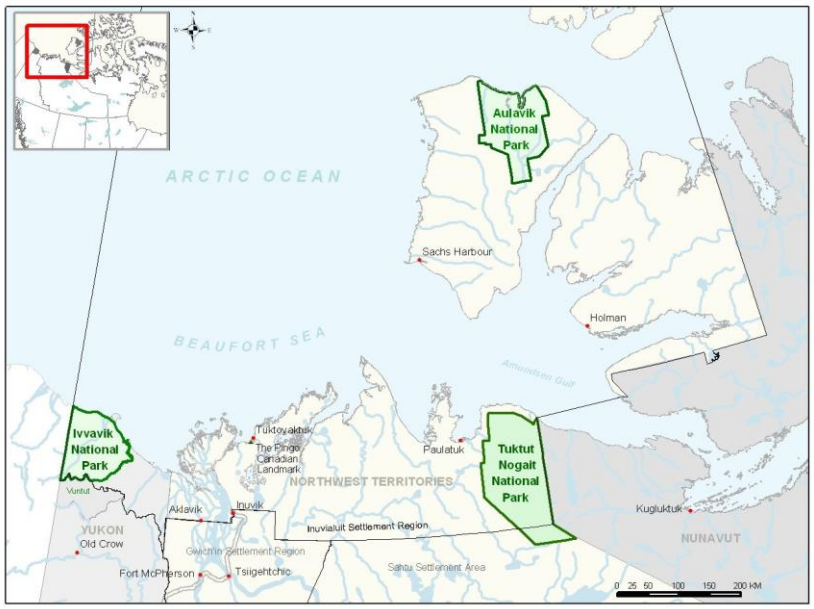

Figure 1. Regional Map of the National Parks and Landmark in the Western Arctic

3.0 Goals

- To protect the ecological and cultural integrity of the national parks and landmark in the Western Arctic.
- To support Parks Canada's operational objectives and the operations of management partners.
- To limit visual impairment of the landscape in support of visitor experience.

4.0 Objectives

- To minimize the amount of fuel stored on national park lands for park management and operational needs.
- To improve inventory capacity and control the storage of fuel in the national parks and landmark in the Western Arctic, and prevent the deterioration of drums due to handling, age and corrosion.
- To ensure that equipment is available at all fuel cache sites and clear protocols are in place for fuel containment and spill response.
- To minimize visual impairment and refuse at fuel cache locations.

5.0 Fuel Cache Locations in the National Parks of the Western Arctic

There are four designated fuel cache sites on lands administered by Parks Canada in the Western Arctic Field Unit. Temporary fuel storage at non-designated fuel cache sites will be considered by the Superintendent on a case-by-case basis (Section 7.0). All fuel drums stored in a national park or landmark are subject to the general protocols outlined in this document.

Aulavik National Park of Canada

- Green Cabin (73° 13′ N / 119° 32′ W)

The Green Cabin fuel cache is located near the southern park boundary along the Thomsen River. This site also has a cabin and an airstrip.

- Polar Bear Cabin (74° 08′ N / 119° 59′ W)

The Polar Bear Cabin fuel cache is located near Nangmagvik Lake. This site also has a cabin and an airstrip.

Ivvavik National Park of Canada

- Komakuk Beach (69° 36′ N / 140° 10′ W)

The Komakuk Beach fuel cache is located along the airstrip adjacent to a Department of National Defence North Warning System facility.

- Sheep Creek Station (69° 09′ N / 140° 09′ W)

The Sheep Creek fuel cache is located next to the airstrip at this facility.

Tuktut Nogait National Park of Canada

There are no designated fuel cache sites in Tuktut Nogait National Park.

Pingo Canadian Landmark

There are no designated fuel cache sites in the Pingo Canadian Landmark. The Pingo Canadian Landmark is adjacent to the community of Tuktoyaktuk.

6.0 General Protocols for Fuel Caching

Authorization:

- Written authorization from the Field Unit Superintendent or his/her designate is required before you can cache fuel on lands administered by Parks Canada in the Western Arctic Field Unit. The process for acquiring this authorization is detailed in Section 7.0.

- Fuel drums must be cached at the designated areas listed in or appended to this protocol, or as authorized by the Field Unit Superintendent. All fuel drums stored in a national park or landmark are subject to the general protocols herein.

- All cached fuel drums must be removed by the end of the period of occupancy indicated on the authorization.

Fuel Drum Delivery:

- Avoid rough handling of fuel drums.

- Delivery of fuel drums will include visual inspection of the bottom and top seam and bung for signs of leakage upon placement at each fuel cache location.

- Delivery of fuel drums will include placement of drums in approved secondary containment.

- Fuel drums stored in berm-style secondary containment units must be stored upright and not stacked.

Fuel Drum Cache:

- All fuel must be stored in new or reconditioned drums that are not damaged, rusted, or leaking.

- All caches must be located at least 100 metres above the high water mark of any water body including ephemeral drainages.

- All drums must bear a Workplace Hazardous Materials Information System (WHMIS) label and product identifier label.

- All fuel drums must be clearly marked with:

    - Year placed at the cache site, and

    - Responsible department or agency.

- The permitted period of occupancy for all fuel drums (full, partial, and empty) at fuel cache locations may not exceed three years from the date placed at the site.

- Parks Canada provides a spill kit at each designated fuel cache site (Appendix 1). Please contact the Fuel Cache Coordinator so you are aware of the spill kit location. Spill kits will be required for temporary fuel storage at any non-designated fuel cache sites as authorized by the Superintendent.

Secondary Containment:

- All cached fuel drums must be stored in portable secondary containment units with impermeable fuel catchment basin to contain spilled fuel. Due to the remote nature of the sites, these units must be convenient to transport in an aircraft class available in Inuvik, Northwest Territories and capable of landing at these sites (generally a helicopter or twin otter-type aircraft).

- Construction of permanent fuel containment storage structures within the national parks and landmark of the Western Arctic Field Unit is not permitted.

- The secondary containment unit must be capable of containing a volume of spilled fuel 25% greater than the capacity of the largest fuel container placed herein (e.g. if the largest fuel container is a 205 litre drum, the secondary containment unit must be capable of containing a spill of 255 litres). Please note that the fuel containment capacity requirements of any unit will be subject to the discretion of the Superintendent or his/her designate and may increase depending on factors such as quantity of fuel to be cached in the unit and type of containment unit employed.

- As these sites are sometimes not visited for up to nine months, the containment unit must be weatherproofed to keep water and snow out of the containment area using a system that can easily be accessed and secured by fuel cache users and requires limited upkeep.

- Fuel drums stored in berm-style secondary containment units must be stored upright and not stacked.

- Secondary containment units must not be locked.

- See Appendix 2 - Examples of Secondary Containment Units used by Parks Canada

Inventory:

At the end of each summer field season (mid-September), groups storing fuel will be required to provide Parks Canada with an updated fuel drum inventory for cache site(s) by fuel type and year placed at the site, indicating the number of full, partial, and empty drums remaining. Complete the Fuel Cache Inventory Form (Appendix 3) and send it to the Fuel Cache Coordinator.

Non-Compliance:

Failure to comply with general protocols herein will result in fuel drum removal initiated by Parks Canada at the cost of the owner or responsible department/agency.

7.0 Authorization Process for Caching Fuel in the National Parks of the Western Arctic

- If you want to cache fuel within a national park in the Western Arctic Field Unit, please plan for a minimum of 60 days from date of your written request is submitted to receipt of authorization.

- Contact our Fuel Cache Coordinator (Section 10.0) early on in your planning process to discuss your caching needs and the application of general protocols.

- Complete the Fuel Caching Request Form (Appendix 4) and send it to the Fuel Cache Coordinator.

- Your request will be reviewed, and upon approval, a written authorization will be issued by the Superintendent or his/her designate, which will permit you to place your fuel on lands administered by Parks Canada subject to the general protocols outlined in this document. Additional terms and conditions may be applied at the discretion of the Superintendent.

8.0 Emergency Response and Spill Containment

A summary of steps to take to manage damaged drums and/or to contain, clean and report fuel spills is found in Appendices V and VI.

9.0 Emergency Contact Information

Parks Canada, Western Arctic Field Unit

Office: 867-777-8800

Cell: 867-777-4893 (summer only)

Yukon Spill Line

(867) 667-7244

Northwest Territories Spill Line

(867) 920-8130

10.0 Contact Information for Parks Canada's Western Arctic Field Unit

Fuel Cache Coordinator

For questions about this protocol or fuel caching in the National Parks of the Western Arctic Field Unit contact:

Fuel Cache Coordinator

Parks Canada - Western Arctic Field Unit

P.O. Box 1840

Inuvik, N.T, X0E 0T0

Office: 867-777-8800

Fax: 867-777-8820

Cell: 867-777-4893 (summer only)

Fuel Caching Protocol for National Parks in the Western Arctic (April, 2006)

APPROVAL PAGE

Fuel Caching Protocol for National Parks in the Western Arctic (April, 2006).

Protocol Prepared By:
D. Drummond
Park Warden and Fuel Cache Coordinator
Western Arctic Field Unit

Recommended By: **Date:**
Original signed by

_____ _____
C. Bucher
A/ Resource Conservation Manager
Western Arctic Field Unit

_____ _____
E. McLean
Ecosystem Scientist II and
Environmental Management Systems Coordinator
Western Arctic Field Unit

Approved By: **Date:**
Original signed by

_____ _____
A. Fehr
Superintendent
Western Arctic Field Unit

Appendix i: Contents of Spill Kits

Parks Canada – Western Arctic Field Unit provides a spill kit (for oil and fuel only) at each designated fuel cache site in the national parks of the Western Arctic. The kit is contained within a 55 Gal. blue H.D. polyethylene drum. Please contact the Fuel Cache Coordinator so you are aware of the spill kit location at the designated fuel cache site.

Each kit includes:

1 x 55 Gal Blue Poly Drum with lid and band
100 x Sorbent Pads (17"x19") 12oz
4 x Sorbent Socks (96"x 3")
12 x Sorbent Socks (48"x 3")
20 x Hand Wipes
6 x Disposal Bags with ties
1 x 20lb Granular All Purpose Absorbent
1 x Knife
1 x Duct Tape
3 x Dust Masks
2 x prs. Green Nitrile Gloves
2 x prs. Goggles
2 x prs. Disposable Coveralls
1 x Instruction Sheet
1 x Plug-n-Dyke drum calking (dry)
1 x Shovel
2 x Tarpaulins

For more information on spill kits:

- ***Acklands Grainger Inc***. - www.acklandsgrainger.com

- ***Arcus Absorbents Inc***. - www.arcusabsorbents.com

- ***Can-Ross Environmental Services Ltd***. - www.canross.com

Appendix ii: Examples of Secondary Containment Units used by Parks Canada – Western Arctic Field Unit

Secondary Containment

Parks Canada – Western Arctic Field Unit currently uses two secondary containment systems designed to minimize environmental damage from a fuel spill resulting from a failure in the drum, a loose bung or damaged bung seal.

a) Outdoor Barrel Containment Unit

- ***Pye Brothers Fuels Ltd*. -** www.pyebrothers.ca/Accessories/index.htm

b) Snap-Up Stinger Berms

- ***Acklands-Grainger Inc.* -** www.acklandsgrainger.com
- ***Clean Spill* -** (905) 293-9995
- ***ENPAC Corporation* -** www.enpac.com

Appendix iii: Parks Canada – Western Arctic Field Unit Fuel Cache Inventory Form

Fuel Cache Inventory Form

At the end of each summer field season (mid-September), groups that have fuel stored in national parks in the Western Arctic are required to provide Parks Canada – Western Arctic Field Unit with an updated fuel drum inventory. Please fill out this Fuel Cache Inventory form and send to address provided below. Thank you!

Responsible Department/Agency:	**Date:**
Contact Person:	
Phone # :	**E-Mail:**
Project:	

Fuel Cache Location	**Fuel Type**	**# *Full* Drums**	**# *Partial* Drums**	**# *Empty* Drums**	**Year Placed at Site**

Comments:

Send Completed Fuel Inventory Form to:

Fuel Cache Coordinator
Parks Canada - Western Arctic Field Unit
P.O. Box 1840
Inuvik, N.T.
X0E 0T0

Fax: 867-777-8820

Parks Canada Parcs Canada

Canada

Fuel Cache Inventory Form (April, 2006)

Appendix iv: Fuel Caching Request Form

Fuel Caching Request Form

Please plan for a **minimum of 60 days** from date of your written request is submitted to receipt of authorization. Contact our fuel cache coordinator early on in your planning process to discuss your caching needs and the application of general protocols.

Department/Agency		**Date**
Name	**Title**	
Project		
Address	**City**	**Postal Code**
Telephone Number	**E-Mail**	
Emergency Contact Number		

Where would you like to cache fuel?

Fuel Cache Location (Check One)	**Fuel Type**	***# of Drums***	**Date Placed at Site**	***Removal Date**
☐ **Sheep Creek Station** (Ivvavik National Park)				
☐ **Komakuk Beach** (Ivvavik National Park)				
☐ **Green Cabin** (Aulavik Nationl Park)				
☐ **Polar Bear Cabin** (Aulavik National Park)				
☐ Other _____ (National Park and UTM)				

*The permitted period of occupancy for all fuel drums (full, partial, and empty) at fuel cache locations may not exceed three years from the date placed at the site.

Do you currently have fuel drums cached in the Western Arctic National Parks ?

Fuel Cache Location	**Fuel Type**	***# of Full* Drums**	***# Partial* Drums**	***# Empty* Drums**	***Year Placed at Site**

Additional Details on Protocol Compliance

On a separate page to be submitted with your Fuel Caching Request Form, briefly outline your plan to comply with general fuel caching protocols, including: name of air charter company to be used for fuel delivery; schedule and budget for deployment and removal of fuel; description of secondary containment system to be used; and any other best practices you intend to implement.

Send Completed Fuel Caching Request Form to:

Fuel Cache Coordinator
Parks Canada - Western Arctic Field Unit
P.O. Box 1840
Inuvik, N.T.
X0E 0T0
Fax: 867-777-8820

Parks Canada Parcs Canada Canada

Fuel Caching Request Form (April, 2006)

Appendix v: Emergency Response and Spill Containment

Drum damaged? Follow the instructions below:

1. Manoeuvre drum so damage is on top to reduce leaking.
2. Put the drum on secondary containment.
3. Drums may be patched by using the Plug-n-Dyke provided in spill kit.
4. Mark damaged drums immediately so contents are not re-used.
5. Remove drums from site immediately. The removal of damaged drums is an operational priority.

Spill occurred? Follow the instructions below:

1. Use spill kit provided to contain and clean-up:
   - Take absorbents from spill kit and soak up as much free product as possible. The shovel provided may be used to dig up product-soaked soil.
   - Use booms to skim contaminants off the top of the water.
   - Place contaminated absorbents and contaminated soil in spill kit drum and/or use tarps provided.
   - Remove contaminated material from site immediately. The removal of these materials is an operational priority.

2. Immediately report all spills to Parks Canada, Western Arctic Field Unit at 867-777-8800 or 867-777-4893 (summer only); and

3. For spills that occur in the Yukon Territory, including Ivvavik National Park, report to the Yukon Spill Line at (867) 667-7244. You are legally required to immediately report any spills in the Yukon Territory greater than 200 liters; or

4. For spills that occur in the Northwest Territories, including Aulavik National Park, Tuktut Nogait National Park and the Pingo Canadian Landmark, report to the Northwest Territories Spill Line at (867) 920-8130. You are legally required to immediately report any spills in the Northwest Territories greater than 100 liters.

Appendix vi: Northwest Territories Spill Report Form

Northwest Territories

NWT SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

24 – Hour Report Line
Phone: (867) 920-8130
Fax: (867) 873-6924

A Report Date and Time	B Date and Time of spill (if known)	C ☐ Original Report ☐ Update no.____	Spill Number
D Location and map coordinates (if known) and direction (if moving)			
E Partly responsible for spill			
F Product(s) spilled and estimated quantities (provide metric volumes/weights if possible)			
G Cause of spill			
H Is spill terminated? ☐ yes ☐ no	I If spill is continuing, give estimated rate	J Is further spillage possible? ☐ yes ☐ no	K Extent of contaminated area (in square meters if possible)
L Factors effecting spill or recovery (weather conditions, terrain, snow cover, etc.)		M Containment (natural depression, dikes, etc.)	
N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials			
O Do you require assistance? ☐ no ☐ yes, describe:	P Possible hazards to person, property, or environment; eg: fire, drink water, fish or wildlife		
Q Comments or recommendations		FOR SPILL LINE USE ONLY Lead agency Spill significance Lead Agency contact and time Is this file now closed? ☐ yes ☐ no	
Reported by	Position. Employer, Location	Telephone	
Reported to	Position. Employer, Location	Telephone	

NWT 1752/0202