Appendix I

Hirner, J. (May 2013). *Potential Impacts of Proposed Recreational Activities on Mountain Goats, Spearhead Area of Garibaldi Park*. Prepared for BC Parks South Coast Region, Ministry of Environment, 7pp.

Potential Impacts of Proposed Recreational Activities on Mountain Goats, Spearhead Area of Garibaldi Park

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May 2013

Introduction

Mountain Goats are a species of particular importance in British Columbia. The global distribution of Mountain Goats is limited to western North America, with over 50% of the world's population occurring in BC (MGMT 2010). Although Mountain Goats are not considered a species at risk (BC CDC 2013), within the Conservation Framework Mountain Goats are ranked Priority 1 (highest priority) for Goal 2: Prevent species and ecosystems from becoming at risk (BC Conservation Framework 2013). Recent estimates of population trends suggest that populations are stable-decreasing to decreasing in the Lower Mainland region (MGMT 2010; S. Rochetta, personal communication, May 22, 2012). Mountain Goats are sensitive to disturbance from human activities, and parks and protected areas are considered important for protecting goats from disturbance and habitat loss due to industrial development (MGMT 2010). However, recreational activities are also known to cause disturbance to Mountain Goats and may reduce habitat effectiveness, even in parks (MGMT 2010).

Mountain Goats occur in Garibaldi Park, including the Spearhead Area. Winter range habitat has been identified and mapped within the Spearhead Area, and recent winter surveys suggest that these habitats are well occupied with populations of Mountain Goats. The availability and use of habitat by Mountain Goats at other times of year within the Spearhead Area is less well understood. However, general knowledge of goat biology, qualitative assessment of habitat conditions, and GIS analysis of factors limiting habitat suitability, such as access to escape terrain, suggest that goats may use the Spearhead Area throughout the year. In particular, the Spearhead Area likely provides important habitat in the spring for the birth of kids, early rearing, and foraging, because these habitats are typically found within or close to goat winter ranges.

Recent GIS analyses also show that current and proposed human activities overlap with goat habitat. These overlaps have the potential to cause negative impacts to Mountain Goat populations in the Spearhead Area, because Mountain Goats are sensitive to disturbance from human activity, including recreation. This report provides a summary of what we know about Mountain Goat habitat and activity in the Spearhead Area, and a qualitative assessment of the risk of current and proposed recreational activities to Mountain Goats.

Mountain Goat Habitat and Use in the Spearhead Area

Mountain Goat Winter Range

The availability of suitable habitat in winter ("winter range") is an important limiting factor for Mountain Goat populations. Movements tend to be restricted in winter, likely due to the energetic costs of moving through deep snow. Habitat requirements in winter include access to escape terrain, and conditions that limit snow cover and improve access to forage, such as steep snow-shedding slopes and/or forest stand conditions that limit snow cover (MGMT 2010).

Two Mountain Goat winter ranges have been mapped in the Spearhead Area; one on the steep slopes on the north side of Fitzsimmons Creek watershed and one to the north and east of Cheakamus Lake. Winter aerial surveys were periodically conducted at these two winter ranges between 1978 and 2000, and every one of these surveys detected Mountain Goat activity (Schultz 2000; Table 1). More recently aerial surveys were conducted in March 2012 and 2013. The number of goats observed in 2012 was particularly high (Table 1): 9 (including 4 kids) at Fitzsimmons and 19 (including 6 kids) at Cheakamus. These numbers were higher than observed in the past on these winter ranges (particularly for Cheakamus), and were high relative to goat populations elsewhere in the region, which have generally been observed to be declining (S. Rochetta, personal communication, May 22, 2012). The number of kids was also notably high. For example, during winter aerial surveys in 1997 throughout Garibaldi Park, of 135 goats detected only 12 (9%) were kids (Schultz 1997). In contrast, 10 kids among 28 total represents 36% of the goats observed at Fitzsimmons and Cheakamus in 2012.

Numbers observed in 2013 were lower than in 2012, likely because a significant snowfall had occurred overnight, limiting detection of tracks and likely causing goats to remain under tree cover. Because conditions were suboptimal and a kid and a juvenile were among the goats observed on both winter ranges, there is no reason to believe that the population condition has changed between 2012 and 2013 on these two winter ranges (S. Rochetta, personal communication, March 18, 2013).

On provincial Crown Land where the *Forests and Range Practices Act* applies, identified Mountain Goat winter ranges are legally designated as Ungulate Winter Range because of the importance of suitable habitat in winter for Mountain Goats. Forest harvesting activities are only allowed through an exemption, and exemptions are normally only considered under certain conditions, e.g. where harvesting would enhance the quality of the winter range habitat or where there is a requirement for a road to be built and no other practicable options exist.

Table 1. Number of mountain goats counted during winter aerial surveys in the Fitzsimmons and Cheakamus winter ranges. Data from 1978 to 2000 taken from Schultz (2000).

Year	Number of goats Fitzsimmons	Cheakamus
1978	5	Tracks
1988	Tracks	Not surveyed
1990	2	Tracks
1992	6	2
1997	8	4
2000	8	8
2012	9 (including 4 kids)	19 (including 6 kids and 1 juvenile)
2013	6 (including 1 kid)	5 (including 1juvenile)

Spring Habitat for Birthing and Rearing of Kids and Foraging

Birthing of kids is highly synchronous and occurs between mid-May and mid-June. Birthing sites are generally widely dispersed within or near winter ranges, often in rugged, inaccessible cliffs but with limited precipitous habitat, and may occur near treeline within the forest. Steep terrain for escaping predators is important for goats throughout the year, but is particularly important during spring birthing (MGMT 2010).

Females disperse and isolate themselves from other animals just before birthing but rejoin other females and young in nursery groups within 5-14 days of birth. Habitats used for early rearing overlap with birthing sites. Groups of animals (excluding adult males) tend to form nursery groups shortly after nannies and kids leave the birthing sites; these groups typically begin moving upslope following green-up to their summer range. Summer range is important during the early rearing period and is typically associated with meadow-like openings that have rich forage and nearby escape terrain (MGMT 2010).

Given the above, Mountain Goats very likely occur on or near the Cheakamus and Fitzsimmons winter ranges during the birthing and early rearing period, and are likely to use suitable habitat upslope of these ranges for spring foraging. A 1989 review of goat observations throughout Garibaldi Park suggests that Mountain Goats in the park remain on winter range until at least late April (Blood 1989). Upslope of the Cheakamus winter range are areas of alpine meadows that are likely important as early rearing and foraging habitat during the spring and early summer period (S. Rochetta, personal communication, September 26, 2012). The Fitzsimmons winter range extends almost to the height of land on the north side of the Fitzsimmons watershed, and based on satellite imagery it appears that little suitable foraging habitat exists upslope of the winter range or on the immediate other side of the ridge to the north. However, it does appear that the upper slopes within the mapped winter range include suitable spring forage habitat.

Summer and Fall Habitat

Goat movements appear to be harder to predict in summer, but generally summer forage habitat includes alpine meadows with rich forage and nearby escape terrain. Areas within the Coastal Mountain-heather Alpine Biogeoclimatic (BEC) zone could be roughly classified as suitable summer forage habitat, because Alpine Meadows have been classified as the provincial "benchmark" (best) habitat for the growing season for Mountain Goats in the Coast and Mountains Ecoprovince (in which Garibaldi Park is located) (RISC 1999). However, some habitat within this BEC zone would not be vegetated (i.e. rock and ice rather than alpine meadows).

Summer habitat also requires access to summer thermal refugia and escape terrain. Thermal refugia are areas where Mountain Goats can protect themselves from overheating by seeking cover, in the form of topography (cliffs, scattered ledges, overhangs and caves) or conifer forest. Escape terrain is required all year and has been defined as slopes greater than 40° or 84%, shear or broken cliffs and usually rock substrate. Mountain goats are usually reluctant to venture more than 400-500 m from escape terrain, often less distance during winter. Thus quality habitat is provided by areas of forage interspersed with escape terrain (MGMT 2010).

One other habitat type that may be limiting is migration corridors between suitable habitats and seasonal ranges. Goats may establish trails within these connecting habitats. No such trails have been identified in the Spearhead Area. In the fall, Mountain Goats can be assumed to be travelling back to their winter range habitats in preparation for winter (Steve Rochetta, personal communication, March 18, 2013).

In general, very little is known about summer and fall habitat use and movements in the Spearhead. Only one aerial survey has been conducted in the Spearhead Area in late summer/early fall, on September 21,1987 (Jones 1988); this survey did not include the Cheakamus watershed. During this survey, map records indicate that three goats were observed on the south facing slopes between Blackcomb Peak and Decker Mountain, and five goats were observed on the south facing slopes below Tremor Mountain, at the eastern end of the Fitsimmons watershed. Although we do not have exact location coordinates for these observations, they appear to be within or just above the top boundaries of the mapped Fitzsimmons winter range.

To help predict areas of suitable summer habitat, Anders Hopperstead (GIS Analyst, Ministry of Forests, Lands and Natural Resource Operations) conducted an analysis which identified escape terrain within the Coastal Mountain-heather Alpine Biogeoclimatic (BEC) zone and then buffered the escape terrain by 500 m to create a summer habitat GIS layer. Based on this analysis, summer habitat appears to be widely available within the Spearhead Area. However, the analysis did not account for the fact that much of the identified potential habitat is not vegetated. The detailed vegetation data required for this type of analysis is not currently available, but a qualitative analysis of satellite imagery suggests that suitable foraging habitat may be much more limited than the current analysis suggests, because many areas appear to be rock with little vegetation.

Potential Impacts and Risks of Existing and Proposed Recreational Activities within the Spearhead Area

GIS analysis

In January 2013 Anders Hopperstead completed GIS analyses to determine whether the existing and proposed recreational activities being considered as part of the Management Plan Amendment for the Spearhead Area were compliant with the recommended buffer distances as described in the *Management Plan for the Mountain Goat (Oreamnos americanus) in British Columbia* (MGMT 2010). These recommended buffer distances are based on the best available science for Mountain Goats and are meant to protect Mountain Goats from disturbance from human activities. The results were as follows:

a) *Helicopters should be kept 2000 m (horizontal distance) and 400 m (vertical separation) from Mountain Goat habitat.*
The boundaries of the current heli-skiing permit area are within 2000 m of the Fitzsimmons winter range, and within as little as 100 m in some areas. According to the Mountain Goat management recommendations (MGMT 2010), the horizontal distance may be reduced where topographic features prevent "line of sight" viewing to the area of Mountain Goat habitat. There is a height of land between the Fitzsimmons winter range and most of the heli-skiing permit area, which can be assumed to mitigate to some extent the impacts of heli-skiing on Mountain Goats in the Fitzsimmons winter range.

b) *Maintain a 500 m buffer zone adjacent to important Mountain Goat habitat (including winter range and kidding/early rearing areas) for industrial development, which includes trail development.*
The draft locations for trails and backcountry huts at the time of the Management Plan Amendment process were used for this analysis. Although trails and huts do not fit the description of industrial development in the long-term, during construction they could have attributes of industrial development such as noise, tree cutting, machinery, etc. The GIS analyses showed that the proposed Russet and Pattison backcountry hut locations and part of the proposed Singing Pass Connector Trail are within this zone. However, more recent assessment of the proposed Singing Pass Connector suggests that this trail is likely not feasible. The proposed summer route trail on the north side of the Spearhead is entirely within the boundaries of the Fitzsimmons winter range.

c) *Maintain a 100 m buffer between important goat habitat and non-motorized recreational activities. Locate facilities and trails away from these habitats.*
As stated under (b), the proposed summer route trail on the north side of the Spearhead is entirely within the boundaries of the Fitzsimmons winter range. The proposed campsite at Mount Pattison and part of the proposed Singing Pass connector trail are also within this buffer. However, more recent assessment of the proposed Singing Pass Connector suggests that this trail is likely not feasible.

Potential impacts and risks

a) *Heli-skiing:* We do not know to what extent the height of land between the heli-skiing permit area and the Fitzsimmons winter range provides mitigation for the impacts of helicopters on Mountain Goats. The fact that the Fitzsimmons winter range has been

occupied during all winter aerial surveys conducted since the 1970s suggests that goats are able to coexist with the adjacent heli-skiing, likely because of the height of land separation. However, the existing data do not allow assessment of whether or not helicopter activity has had other impacts on Mountain Goats. For example, although goats appear to be consistently present, we do not know if their population would be higher if heli-skiing were not occurring nearby.

b) *Proposed trails:* The fact that the summer route on the north side of the Spearhead Area crosses the upper slopes of the Fitzsimmons winter range is particularly problematic and poses several potential risks to Mountain Goats. Although the route would not be used in winter, it is possible that this area is important for goats outside of winter, particularly during birthing, early rearing, and foraging. Mountain Goats would be particularly sensitive to disturbance during spring because of the presence of new kids and because of nutritional stress at the end of winter. The potential for impacts to kidding terrain is also particularly problematic because Mountain Goats have a naturally low reproductive rate and survival of kids is low. Seasonal closures of the trail during the spring period potentially could mitigate impacts, but closures would be difficult to enforce. The physical changes on the landscape due to trail construction and maintenance could also affect the quality of goat habitat year-round, especially if tree removal were required for the trail.

c) *Proposed huts and associated campsites:* The recommendations in the Mountain Goat Management Plan (MGMT 2010) suggest that some of the proposed locations for huts and campsites may be too close to important goat habitat. An additional important aspect of assessing the risk of these facilities is that they will have a zone of influence larger than their location, especially if there are lines of sight to important goat habitat or if the terrain adjacent to facilities invites people to wander. The proposed location of the Russet Hut was identified as being problematic in part for these reasons, and was visited in September 2012 for further assessment. During that site visit other potential hut locations (including the existing hut at Russet Lake) were identified that were further and out of sight from the alpine meadow foraging habitats directly upslope from the Cheakamus winter range. The existing Russet Lake site is likely the best alternative location for mitigating impacts to goats, because it is relatively far from the Cheakamus winter range, has already experienced impacts, and limits the increase of human footprint in the area.

Information Needs

Additional information about spring and summer habitat availability and use in the Spearhead Area would help to determine which areas are most important to Mountain Goats year-round, and to confirm that the upper slopes of the Fitzsimmons winter range are used in spring and summer. This information could also be used to determine if summer habitat is widely available or limited in the Spearhead Area. Understanding more about the location and availability of spring and summer habitat would allow us to better assess the risk of recreational activities to Mountain Goats and to locate trails and other facilities and uses in areas least likely to cause impacts. Spring and summer field surveys (aerial and/or ground) of goats and goat habitat attributes would help provide this information.

Conclusion

The risks of current and proposed recreational activities to Mountain Goats in the Spearhead Area cannot be precisely quantified, but there is a risk of negative impacts. Mountain Goats are known to be easily stressed and disturbed by human activities, including non-motorized recreation. Recent surveys suggest that healthy and reproducing populations of Mountain Goats exist in the Spearhead Area, but elsewhere in the region, Mountain Goat populations appear to be declining. Stressors to Mountain Goats such as industrial activity and motorized recreation are widespread outside the park, and climate change will likely further stress Mountain Goats in the future, which increases the relative importance of undisturbed habitats and the Mountain Goat populations they support. For example, healthy goat populations in the park could be sources for maintenance and recovery of populations outside the park. Because the Spearhead populations occur very close to the community of Whistler and heli-skiing already occurs close by, these populations may already be under a certain level of stress, and the effects of additional facilities and activities may be cumulative. If the goal is to maintain healthy populations of Mountain Goats in the Spearhead Area of Garibaldi Park, recreational activities should be planned and managed to minimize impacts to Mountain Goats. Applying a precautionary approach to management, this would include phasing out activities with potential negative effects, and locating facilities to avoid important Mountain Goat habitat.

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Garibaldi Park

Management Plan Amendment for the Spearhead Area

February 2014

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Cover photo: BC Parks

This Management Plan Amendment provides complimentary management direction to the 1990 Garibaldi Park Master Plan. The 1990 Master Plan still guides the management of other areas of Garibaldi Park outside of the Spearhead Area. Much of the general management direction in the 1990 Master Plan continues to apply within the Spearhead Area.

Garibaldi Park

Management Plan Amendment for the Spearhead Area

Approved by:

February 21, 2014

Jennie Aikman
Regional Director
South Coast Region
BC Parks

Date

February 21, 2014

Brian Bawtinheimer
Executive Director
Parks Planning and Management Branch
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Date

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1. Introduction

In January 2012, BC Parks initiated a management plan amendment process for Garibaldi Park ("the plan amendment"). The plan amendment is focussed on what is referred to here as the "Spearhead Area" of Garibaldi Park. The Spearhead Area encompasses the Spearhead and Fitzsimmons mountain ranges which together form a horseshoe of mountains connecting Blackcomb Mountain to Whistler Mountain (Figure 1). The purpose of the plan amendment process is to revisit the management direction in the 1990 Garibaldi Provincial Park Master Plan ("the 1990 Master Plan") and provide supplemental direction required to address management issues specifically affecting the Spearhead Area.

2. Context

The 1990 Master Plan was the result of an extensive public consultation process completed during the late 1980s. Overall, the management direction provided by the 1990 Master Plan for most of the park is still considered valid today.

The plan amendment is driven by a number of emerging issues specifically affecting the Spearhead Area of Garibaldi Park, which has triggered the need to revisit the management direction for this area. The plan amendment process allowed for updated public, stakeholder, and First Nations' input into the key issues outlined below.

a) Public access and trail connections. There is a need to improve public access, including vehicle access to trailheads and hiking trail connections to the Singing Pass and Cheakamus Lake. There are several new trail connections and other measures proposed to improve public access and visitor experiences.

b) First Nations involvement. The Spearhead Area of Garibaldi Park is situated in the traditional territory of the Squamish Nation and the Lil'wat Nation. Since the 1990 Master Plan, the Province has completed the Sea to Sky Land and Resource Management Plan (LRMP) and land use agreements with both First Nations. The LRMP identified areas of cultural significance to First Nations; this includes the Squamish Nation Wild Spirit Place which encompasses the Cheakamus watershed, a portion of which is within the study area.

   In 2007, BC Parks entered into a collaborative management agreement with Squamish Nation. BC Parks is committed to working collaboratively with Squamish Nation and the Lil'wat Nation in the management of the Spearhead Area of Garibaldi Park. There are known archaeological sites and features within the study area that require specific management direction.

c) Increasing use. Summer and winter recreational use in the Spearhead Area is increasing. Backcountry ski touring is becoming increasingly popular and, due to its

easy accessibility from Whistler, the Spearhead Area of Garibaldi Park is becoming a renowned destination for backcountry skiing.

This plan amendment process considered the development of huts in the Spearhead Area, which, if developed, will attract greater numbers of visitors to the park in both summer and winter. Management direction is provided to support increased levels of use, including modest trail and facility development.

d) Mountain biking. The Whistler area has emerged as a popular destination for mountain biking. Mountain biking is currently limited to the Diamond Head area (from the parking lot to the Elfin Lakes campground) and the south Cheakamus River Trail. The plan amendment process explored whether or not mountain bike access should be permitted in the Spearhead Area.

e) Hut-supported route through the Spearhead Range. The 1990 Master Plan recommended studying a hut-supported ski-touring and hiking route through the Spearhead Area, but did not provide specific direction as to whether huts are appropriate. There is renewed interest in developing a hut system so input regarding the appropriateness of huts in the study area was sought.

f) Heli-skiing. The 1990 Master Plan allowed for the continuation of heli-skiing access into the Spearhead Area of the park. Whistler Heli-Skiing Limited holds a park use permit to provide heli-skiing in this area of the park. In 2011, the permit was renewed for a period of five years. Input on the long-term direction regarding heli-skiing in the Spearhead Area was sought.

3. Scope and Study Area

The plan amendment focussed on six sections of the 1990 Master Plan:

1) Land Management, Section 5.2.1
2) Cultural Resources, Section 5.3
3) Hiking/Backpacking, Section 6.2.1
4) Mountain Biking, Section 6.2.3
5) Winter Recreation, Section 6.2.4
6) Commercial Recreation Services, Section 6.2.5

The plan amendment makes specific amendments to these sections as they relate to the Spearhead Area. All other aspects and direction in the 1990 Master Plan apply (e.g., the objectives and actions in section 5.2.5 - Wildlife Management, such as prohibition on domestic pets).

The Spearhead Area of the park is within the Squamish Lillooet Regional District, directly east of the Resort Municipality of Whistler and adjacent to Whistler Blackcomb's Controlled Recreation Area (CRA). The CRA is Crown land tenured to Whistler Blackcomb and managed under a long-term resort Master Plan agreement.

The Spearhead Area is a popular backcountry ski destination in winter and a popular backcountry hiking and mountaineering destination during the summer months.

The Spearhead Area covers 17,500 hectares of Garibaldi Park, approximately 9% of the total park area. Garibaldi Park is part of a large protected area complex, which includes Golden Ears and Pinecone Burke parks to the south, protecting 2,875 square kilometres (Figure 1). This is one of twelve large park complexes in the province. These complexes protect a range of ecosystems where natural processes occur, making them important for maintaining ecological integrity and managing for resiliency to climate change. This emphasis is particularly important in alpine areas like the Spearhead Area which are most sensitive to a warming climate.

Figure 1: Map of the Study Area for the Garibaldi Park Management Plan Amendment

Public Engagement Process
BC Parks undertook the following steps to complete the plan amendment process:

Step 1: Engage stakeholders and First Nations (March 2012)
Step 2: Initial public input (March 2012)
Step 3: Develop draft management plan amendment (July 2012)
Step 4: Draft management plan amendment available for comment (November 2012 to January 2013)
Step 5: Open houses (December 2012)
Step 6: Management plan amendment update and approvals (February 2013 – February 2014)

A series of workshops, stakeholder meetings and online public comment forms were used to solicit input at the initial phases of the plan amendment process (Steps 1 and 2).

As part of Step 1, stakeholder workshops were held on March 9 and 10, 2012 in Squamish and Whistler. These workshops were attended by 19 representatives of key stakeholder groups. Comments were solicited via a facilitated two-hour session, with written and verbal contributions received.

Step 2 of the management plan amendment process involved the online solicitation of public input on the amendment process through information and a questionnaire posted on the BC Parks' website. During 45 days in February and March 2012, 945 respondents filled out the questionnaire. Of the respondents, 85% were from the Lower Mainland, 50% of which were from the Sea to Sky region. During this same time, over 25 written submissions were received from various stakeholder groups.

As part of Step 3, BC Parks took the input received through Step 1 and Step 2 into consideration in the development of the draft management direction for public comment.

Steps 4 and 5 involved the draft management plan amendment being posted online for a 45-day public comment period starting in November 2012. In December 2012, public open houses were held in Whistler and Vancouver to solicit comment on the draft management direction. There was considerable public interest in the plan amendment, with approximately 400 submissions from the public and stakeholder groups and over 150 people attending the open houses.

4. Mountain Goat - Key Findings and Management Approach

The 1990 Master Plan identified declining Mountain Goat populations as a major wildlife management concern in Garibaldi Park. In response to this, the 1990 Master Plan took a cautious direction regarding the Spearhead traverse backcountry skiing/hiking route and huts, stating that the concept would be studied in detail, including an assessment of the impact on Mountain Goats.

Through the plan amendment process, BC Parks has undertaken further investigation and study of Mountain Goat habitat and populations. This research has informed the management approach recommended in this plan amendment and represents a key foundation for the management direction being put forward on several of the management issues that were addressed in the plan amendment process.

The Province's Conservation Framework ranks Mountain Goat as the highest priority species under Goal 2 of the framework, which is to prevent species and ecosystems from becoming "at risk." Under the Conservation Framework, the management goal for Mountain Goat is to maintain viable, healthy and productive populations of the species throughout its native range.

In 2010, the Province released the *Management Plan for Mountain Goat in British Columbia* ("the Management Plan for Mountain Goat") which identifies conservation measures, based on the best available scientific information, to ensure Mountain Goats do not become threatened or endangered in the province. The Management Plan for Mountain Goat recommends management actions to mitigate threats to Mountain Goats related to habitat, hunting and access.

There is an extant population of Mountain Goats within the Spearhead Area. Winter use of habitats within the Cheakamus and Fitzsimmons watersheds was identified during an aerial survey in 1978. Since then, goat winter range habitats have been identified and mapped within these two watersheds through a small number of surveys and studies. Figure 2 shows the location of the Mountain Goat winter range habitat within the study area.

Over the years, the populations of Mountain Goats in the Spearhead Area of Garibaldi Park have been monitored using aerial surveys, mainly in winter, to provide relative estimates of population abundance and health. Past studies revealed the population of goats in the park is in decline, with 50 to 70 animals estimated in the park in 1990. Small populations like those in Garibaldi Park are more vulnerable and at greatest risk of extirpation (Ministry of Environment, 2010).

BC Parks undertook goat monitoring flights in March 2012 and March 2013. The results indicate that Mountain Goat populations within the study area appear to be relatively stable and healthy although the status of the goat population throughout the park has

not been determined. This is in contrast to declining trends in Mountain Goat populations in the Sea to Sky region outside the park, where they are more vulnerable to human access and development. This context makes the careful management of Mountain Goat populations within the park all the more important. The report *Potential Impacts of Proposed Recreational Activities on Mountain Goats, Spearhead Area of Garibaldi Park* (2013), included as Appendix I, documents the results of BC Parks' study.

BC Parks has taken a precautionary approach in developing the management direction for the Spearhead Area to minimize the potential risk of causing harm to key ecosystem values (e.g. Mountain Goat. Supporting this approach, the plan amendment considers the management recommendations put forward in the Management Plan for Mountain Goat. This ensures sufficient measures are taken to support a viable, healthy population of Mountain Goats in the Spearhead Area in particular with respect to habitat and access.

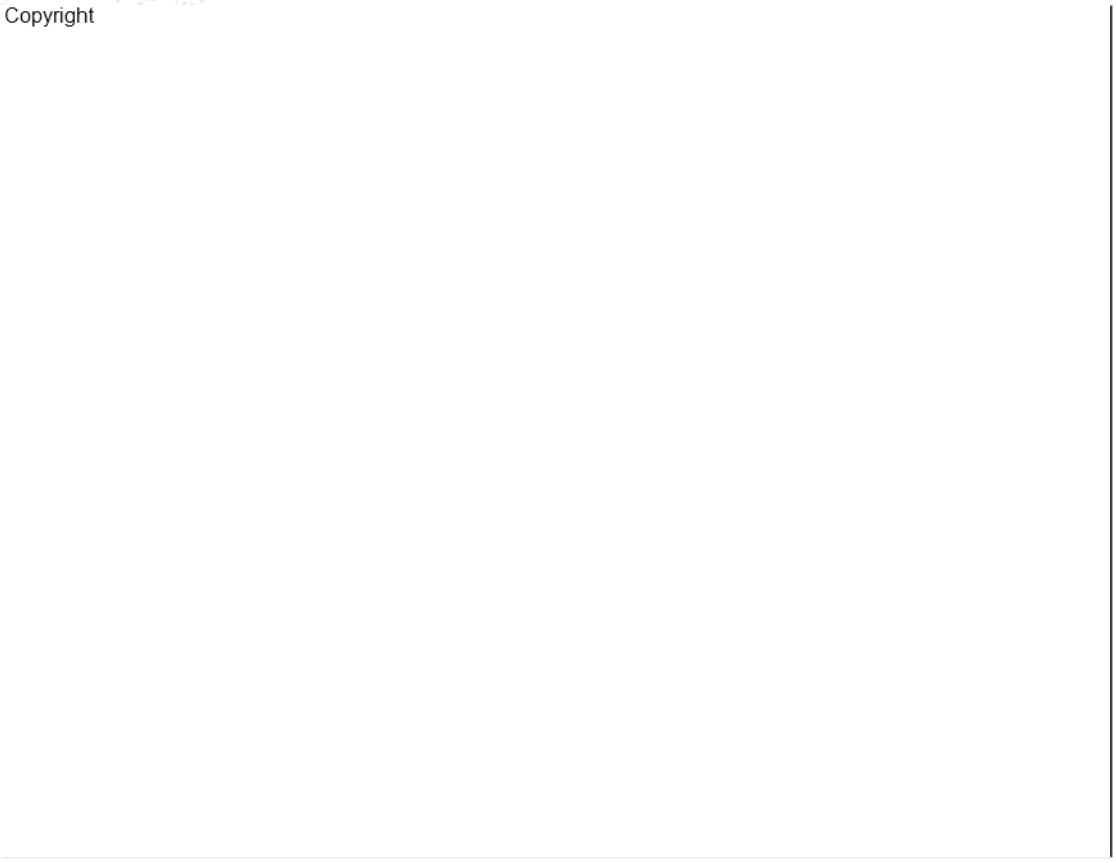

Figure 2: Map of the Mountain Goat Winter Range in the Spearhead Area

5. Management Direction

This section provides management direction related to the following six sections of the 1990 Master Plan:

Section 5.2.1 - Land Management
Section 5.3 - Cultural Resources
Section 6.2.1 - Hiking/Backpacking
Section 6.2.3 - Mountain Biking
Section 6.2.4 - Winter Recreation
Section 6.2.5 - Commercial Recreation Services

Section 5.2.1- LAND MANAGEMENT

Management Issue

There are three main access points to the study area: 1) the Singing Pass Trail, 2) through the Whistler Blackcomb CRA, and 3) via the Cheakamus Lake Forest Service Road (Figure 3). There are challenges associated with each of these access points that present barriers to public access to the park.

a) In recent years a slope failure has eliminated all vehicle access to the former Singing Pass trailhead (situated outside the park). As a result, park visitors have an additional four kilometre hike on a rough road to join up with the existing trail inside the park.

b) Park visitors may also travel through the CRA to access the park, either by way of the chairlift or by hiking or skiing through the CRA on routes connecting into the park. Some of these connections through the CRA are not well defined or signed.

c) The Forest Service Road into the Cheakamus Lake Trailhead is rough and needs to be better signed and upgraded to improve visitor experience.

Summary of Comments Received

The public expressed strong support for improved access to the Spearhead Area of the park. Two main areas of concern were raised: 1) access via the Singing Pass Trail and 2) access through the CRA.

There is strong support for improving public access to the park through the CRA, including the need for clearly defined routes and signage, particularly from the village at the base of Whistler and Blackcomb mountains.

Respondents were supportive of continued access to year-round overnight parking for park visitors, which would increase in demand if a system of huts is developed in the Spearhead Area.

First Nations raised concerns around improved access resulting in increased use in the Spearhead Area and the potential for impacts to cultural sites and use.

Analysis

BC Parks needs to work with adjacent land managers, including Whistler Blackcomb, the Resort Municipality of Whistler, and the Whistler Sliding Centre, to improve public access to the park. This should include improved access to the Singing Pass Trail, with a new vehicle-accessible trailhead and designated and well-defined all-weather access routes through the CRA for both summer and winter use.

In the case of the Singing Pass Trail, public comments underscored the need for repair or replacement of the existing access road and trailhead. Engineering studies have revealed that re-establishing vehicle access to the existing trailhead is not feasible. While this existing access will be preserved as an alternate hiking route from Whistler Village, BC Parks proposes to improve access by developing a new Singing Pass trailhead on the north side of Fitzsimmons Creek. The implementation of this will require access agreements with adjacent land managers, including Whistler Blackcomb, Whistler Sliding Centre, and the operator of the Fitzsimmons waterpower project.

BC Parks will continue to engage with other agencies, including the Resort Municipality of Whistler, to ensure there is appropriate overnight and day use parking for park visitors and to improve access and signage to the Cheakamus Lake trailhead.

Management Plan Amendment

The following new objective and associated strategies are proposed to be added to section 5.2.1:

Objective: To work with adjacent land managers to provide appropriate public access to the Spearhead Area of the park.

Specific Strategies:

- *Work with adjacent land managers to establish a new vehicle-accessible trailhead on the north side of Fitzsimmons Creek to provide summer access to the Singing Pass Trail.*
  - *Connect the Singing Pass Trail to a new trailhead on the north side of Fitzsimmons Creek.*
  - *Explore the establishment of a route from the new trailhead to connect with trails in the park on the Blackcomb side.*
- *Work with Whistler Blackcomb to provide appropriate all-season public access to the park and to improve the park visitor's experience as they travel through the Controlled Recreation Area.*
  - *Designate summer and winter public access rights-of-way through the Controlled Recreation Area through both the Whistler and Blackcomb operating areas.*

- *Develop clearly demarcated trails/routes with signage through the Controlled Recreation Area.*
- *Explore other measures to reduce barriers to year-round park access.*

- *Work with the Resort Municipality of Whistler to ensure appropriate year-round parking is available in Whistler Village for both day use and overnight park visitors.*
- *Work with appropriate provincial ministries, the Resort Municipality of Whistler, and other stakeholders to improve access and signage to the Cheakamus Lake trailhead.*
- *Work with the Lil'wat Nation and Squamish Nation to ensure that appropriate protection measures are in place for First Nation cultural sites to reduce potential impacts resulting from increased visitor use.*

Figure 3: Map of the Study Area Showing the Whistler Blackcomb Controlled Recreation Area and Access Issues

Section 5.3 - CULTURAL RESOURCES

Management Issue

The Spearhead Area of Garibaldi Park is situated in the traditional territory of the Lil'wat Nation and the Squamish Nation. The Spearhead Area has been used by First Nations for hunting, trapping, fishing, gathering, ceremonies, and travel routes. The 1990 Master Plan does not provide management direction regarding First Nations' cultural values in the park. Since the Master Plan was completed in 1990, the Province completed the Sea to Sky LRMP which identified areas of cultural importance to First Nations. This includes the Squamish Nation Wild Spirit Place which encompasses the Cheakamus watershed, a portion of which is within the study area.

In 2007, BC Parks entered into a collaborative management agreement with Squamish Nation. BC Parks is committed to working collaboratively with Squamish Nation and Lil'wat Nation. Also, there are known archaeological sites and features within the study area that require specific management direction.

Summary of Comments Received

Lil'wat Nation completed a study looking at the cultural and archaeological values in the Spearhead Area and made specific recommendations with respect to the plan amendment that are reflected in the management strategies below.

Many respondents also underscored the importance of protecting archaeological sites and First Nations' values and the need to provide education on First Nations' cultural history and traditional uses.

Stakeholders and members of the public noted the cultural value associated with the experience of recreating in a wilderness setting. The Spearhead Area is recognized as an important place where British Columbians and other visitors can access alpine landscapes and experience wilderness and solitude.

The importance of the mountaineering history associated with the Spearhead Area and the Russet (Himmelsbach) Hut was emphasised in several comments.

Analysis

The plan amendment acknowledges that the study area is within the traditional territory of Squamish Nation and Lil'wat Nation. The plan amendment recognises First Nations' cultural and traditional values and uses and includes strategies to protect archaeological sites in the study area. It also includes strategies for developing interpretive opportunities to highlight the First Nations and mountaineering histories associated with Garibaldi Park.

Management Plan Amendment

The following changes are proposed to section 5.3:

Change the name of section 5.3 from "Cultural Resources" to "Cultural Values".

Include the following text as a preamble to the objectives section: *"The Spearhead Area of Garibaldi Park is within the traditional territory of the Lil'wat Nation and the Squamish Nation.*

BC Parks is committed to working collaboratively with First Nations through the implementation of formal agreements including the Collaborative Management Agreement Between the Province and the Squamish Nation, the Agreement on Land Use Planning Between the Squamish First Nation and the Province of BC, and the Land Use Planning Agreement Between the Lil'wat Nation and the Province of BC.

Garibaldi Park, like all parks and protected areas in British Columbia, is subject to constitutionally protected (section 35 of the Constitution Act, 1982) aboriginal and treaty rights."

Add the following objective and strategies to section 5.3:

Objective: Recognise and protect First Nations' cultural values and traditional uses.

Specific strategies:

- *Recognise and enable the practice of First Nations' traditional uses and activities in Garibaldi Park.*
- *Work with Lil'wat Nation, Squamish Nation, and other partners to inform the public about First Nations' history, place names, and traditional uses in the area.*
- *Recognise and protect the Squamish Nation's cultural values associated with the Cheakamus Wild Spirit Place.*
- *Develop site-specific strategies to protect archaeological sites located near park facilities including huts, trails, and campsites.*
- *Register the known pictograph located between Billy Goat Creek and Wedge Creek with the Heritage Branch.*
- *Confirm the location and condition of the aboriginal trail from Billy Goat Creek to Wedge Creek Pass.*

Objective: Provide opportunities to inform the public about the history of Garibaldi Park.

Specific strategies:

- *Work with key partners to provide opportunities to inform the public about Garibaldi Park, including its mountaineering pioneers and history.*

Section 6.2.1- HIKING/BACKPACKING

Management Issue

Summer visitation to the Whistler area is increasing, accompanied by a strong demand for nature-based activities including hiking. According to a Tourism Whistler survey, hiking is cited by visitors as the most important summer activity for guests visiting Whistler, with over 30% of visitors engaging in hiking during their stay. Summer lift access and the Peak 2 Peak Gondola bring many of these visitors to both Whistler and Blackcomb mountains, from where they have access to the spectacular alpine meadows and vistas in the Spearhead Area of the park. As a result, the Spearhead Area is becoming an increasingly popular summer destination. This plan amendment also considers the development of huts in the Spearhead Area, which, if developed, will attract greater numbers of visitors to the park in both summer and winter. Increase in summer use will need to be managed using appropriate facilities, including trails, signage, and campsites. The plan amendment explored expanding the network of trails in the Spearhead Area to improve the range of hiking opportunities available to park visitors.

Summary of Comments Received

While there was support for expanded hiking opportunities in the Spearhead Area, the public emphasised the importance of ensuring that park and facility development is adequately resourced and that priority be placed on the maintenance of existing facilities. Upgrades to existing trails, including the Singing Pass Trail, and the replacement or repair of the Russet (Himmelsbach) Hut were identified as priorities above any new developments. Improved waste management, signage, and additional camping facilities were also identified as high priorities.

There was a high degree of public interest in a “Spearhead Traverse” looping trail through the study area, with associated facilities to focus impacts and minimize environmental damage. A number of respondents raised concerns about the feasibility and cost of an alpine trail on the Blackcomb side, suggesting the terrain would present serious challenges for trail building.

Whistler Blackcomb is interested in developing a trail from the Flute Summit along the Flute ridge to the Singing Pass Trail which - while mostly within the Controlled Recreation Area - would cross over the park boundary in some locations. This trail would provide a shorter loop connecting Whistler Mountain to Whistler Village via the Singing Pass Trail. Public comments reflected general support for this trail concept.

Analysis

There is strong public support for improved hiking trails and supporting facilities within the study area to control and focus visitor impacts and enhance the recreational opportunities available in the park.

BC Parks is taking a particular focus to ensure that trails are designed and developed in ways that prevent impacts to Mountain Goats and avoid impacting other wildlife habitat including Hoary Marmot colonies.

The alpine terrain on the Blackcomb side of the Spearhead is steep and challenging and much is Mountain Goat habitat. BC Parks has studied route options for a hiking trail traversing the Spearhead, and completed a field reconnaissance. Further detailed assessment is required to determine if there is a safe and feasible hiking route through this area that will avoid impacts to Mountain Goat and other important ecosystem values.

The 1990 Master Plan recommended a hiking trail from Cheakamus Lake to the Singing Pass. There was general support for this concept, suggesting it would provide a new opportunity for extended hiking trips in the park. Since then, BC Parks has conducted terrain and route analysis and has determined that such a trail would be challenging and very costly to develop. Additionally, hiking routes up the Singing Creek drainage travel through alpine meadows in close proximity to Mountain Goat habitat. Developing a trail in this area may have adverse impacts to Mountain Goats, which are sensitive to human presence. The proposed trail would travel through the Cheakamus Wild Spirit Place, an area of importance to Squamish Nation. While the Squamish Nation has not objected to existing use within this area, additional trail development in the watershed is inconsistent with their objectives for the Wild Spirit Place.

Finally, forest health assessments at the Cheakamus Lake and Singing Creek campgrounds suggest that future camping closures in this area may need to be considered, although this has yet to be determined. This may have further implications for access and use in the Cheakamus Lake area.

The plan amendment supports the direction in the 1990 Master Plan to develop a loop trail at Adit Lakes. With the possibility of an improved hut at Russet Lake, and an associated increased visitation to the area, new hiking opportunities such as this will serve to improve visitor experiences. Any hut development in the Russet Lake area will be accompanied by additional campsites focussing associated impacts in the vicinity of the hut. Based on this, the 1990 direction to establish additional backcountry campsites at Adit Lakes will be deleted, to limit the use of this area to hiking only.

Management Plan Amendment

Add the following strategies to section 6.2.1:

- *Minimise impacts to sensitive ecosystems and wildlife when designing hiking trails and associated facilities. Ecosystem values of particular concern include habitat for Mountain Goat, Wolverine, Hoary Marmot, Pika, and alpine meadow vegetation.*
- *Assess cumulative impacts when planning and designing hiking trails and associated facilities. This includes impacts on sensitive ecosystems and wildlife as well as impacts on visitor experiences.*
- *Avoid impacts to First Nations' cultural sites and traditional uses when siting and designing hiking trails and associated facilities.*
- *Visitors will be responsible for packing out what they pack in. BC Parks may develop a human waste management plan to address both summer and winter sanitation issues.*
- *Develop a loop hiking trail through the Spearhead Area, with an alpine component where feasible.*
  - *Minimise impacts to wildlife habitat when locating hiking trails. Trail design and construction will follow the Management Plan for Mountain Goat in British Columbia recommendations and may require detailed assessments to ensure impacts to Mountain Goat habitat are avoided.*
  - *Hiking trails will be designed to provide a high-quality, safe hiking opportunity for a range of abilities and to minimise long-term maintenance requirements.*
  - *Basic facilities will be provided where appropriate, including campsites, outhouses, and food caches.*
- *Work with Whistler Blackcomb to develop a trail connecting from the Flute Summit to the Singing Pass Trail.*

The plan amendment confirms support for the implementation of the following strategy:

- *Develop a loop trail linking Russet Lake and Adit Lake.*

Delete the following strategies:

- *A high route trail in the Spearhead range linking the Blackcomb ski area and the Whistler ski area will be studied in detail. Included in the study will be an assessment of impacts to Mountain Goats.*
- *Develop a trail from Cheakamus Lake to Singing Pass.*

The plan amendment removes the reference to developing a backcountry campsite at Adit Lakes:

- *Develop backcountry campsites at Mamquam Lake and Helm Lake ~~and Adit Lakes~~.*

Section 6.2.3 - MOUNTAIN BIKING

Management Issue

Since the drafting of the 1990 Master Plan, mountain biking has emerged as one of the most popular summer activities in the Whistler area and has significant benefit to the local economy[1]. The 1990 Master Plan provides for mountain biking opportunities in Garibaldi Park at Cheakamus Lake and Diamond Head (Elfin Lakes). There is strong local demand for new mountain biking opportunities in the Whistler area, in particular in high alpine areas, as there are few alpine bike trails in the Sea to Sky corridor.

Some mountain bikers are making their way from the Singing Pass Trail and the CRA into the Spearhead Area of the park. This access is not permitted, and, if unmanaged, could result in damage to fragile alpine ecosystems and impacts to wildlife.

Summary of Comments Received

The majority of the public and stakeholder comments on the draft management plan supported BC Parks' proposal to not allow any expansion of mountain biking in the Spearhead Area. Respondents cited concerns around the potential for user conflicts, unauthorised use resulting in damage to sensitive alpine ecosystems, cumulative environmental effects, limits to the area's carrying capacity, and the increased footprint and expense associated with constructing and maintaining a multi-use trail system in an alpine area.

Those who did support the expansion of mountain biking into the Spearhead Area were predominantly interested in an alpine cross-country biking opportunity in the Singing Pass/Musical Bumps area citing the high recreational value associated with such an opportunity.

Mountain biking stakeholder groups, including members of the Whistler Off-Road Cycling Association (WORCA), objected to the draft management direction that did not allow for any mountain biking in the Spearhead Area, despite the feedback from the public in the initial input phase which generally supported a mountain biking opportunity. Local mountain biking stakeholder groups requested that BC Parks reconsider and allow some mountain biking access into the Spearhead Area. WORCA suggested that carefully planned, well-built and managed multi-use trails could minimise

[1] The Western Canada Mountain Bike Tourism Association conducted an economic impact study for communities in the Sea to Sky corridor which showed that public mountain biking trails in the Whistler area generated $6.6 million in economic activity over a period from June - September 2006.

impacts to both the alpine environment and visitor experience, while providing a high-quality recreational experience for a broader spectrum of park visitors.

The Resort Municipality of Whistler and WORCA advocated for the management plan to reflect a commitment to ongoing dialogue between BC Parks and relevant stakeholders regarding a future cross-country mountain biking opportunity in the Spearhead Area.

First Nations questioned the compatibility and acceptability of mountain biking within this area of the park and expressed concerns around damage to ecological values caused by unregulated and increased use.

Analysis

BC Parks considered all the public feedback and acknowledges that there is a strong interest from mountain biking stakeholder groups in developing some access to the Spearhead Area. However, due to the potential for adverse impacts to alpine ecology and wildlife, the plan amendment maintains the direction to not expand mountain biking in the study area. This is based on a fundamental concern that the decision to introduce mountain biking to the Spearhead Area could result in irreversible impacts to sensitive alpine ecosystems. Even with well-designed and well-managed trails, there is significant risk associated with allowing mountain biking in this area of the park, where this activity could result in cumulative environmental impacts, particularly in the wet alpine meadow habitats associated with the Singing Pass area.

With the planned improvements to hiking trails and the possible addition of backcountry huts, BC Parks anticipates that hiking use in the study area, in particular the Singing Pass, will increase over the coming years. To allow a new activity into the area could result in overcrowding and an overall diminishment of the park visitor experience.

Many of the public responded that what they value most about the Spearhead Area of Garibaldi Park is that it is a place where they can readily connect with a sense of wilderness. Allowing mountain biking - an activity that is likely to be associated with high levels of use which would require further trail development - may detract from the wilderness experience which is of value to visitors of Garibaldi Park.

There are other areas in the region where alpine mountain biking trails are being established, including the Sproatt area and in the Spruce Lake area. This presents an opportunity to study the experiences in these areas and gauge the effectiveness of managing long-term ecosystem impacts and conflicts between user groups.

The plan amendment supports a continued dialogue with the local mountain biking community to study the experiences with alpine mountain biking in other areas and recommends a study to assess the long-term impacts on alpine and park environments. The results of this study can inform an assessment of whether or not a future mountain biking opportunity might be developed in the Spearhead Area that fully addresses BC Parks' concerns and requirements. Taking a long-term perspective on the experiences in other areas affords BC Parks the time needed to assess the changes in visitor use levels resulting from other concepts put forward in this plan amendment. BC Parks will

consider whether or not a new activity such as mountain biking may be appropriate in the Spearhead Area at some point in the future through an updated management planning process for Garibaldi Park.

Finally, the management plan amendment removes the reference from the 1990 Master Plan regarding a proposed mountain biking trail on the south side of the Cheakamus River. A trail evaluation conducted by BC Parks in conjunction with WORCA in July 1998 recommended that a mountain biking trail on the south side of Cheakamus "should be abandoned for technical, safety and environmental reasons."

Management Plan Amendment

Amend the objective in section 6.2.3:

Objective: Encourage mountain bike access to trailhead parking areas but limit cycling to two areas: the Red Heather Ridge trail up to the Elfin Shelter and the ~~proposed south~~ Cheakamus ~~River~~ Lake Trail.

Add the following objectives and strategies:

Objective: Study the development, use and impacts of high-elevation cross-country mountain biking trails in other areas.

Specific strategies:

- *Work with the Resort Municipality of Whistler and other key stakeholders to study the long-term impacts and use associated with alpine mountain biking trails in the Sea to Sky region and other areas, including provincial and national parks.*

Objective: Assess the feasibility of a cross-country mountain biking opportunity in the Spearhead Area.

Specific strategies:

- *Undertake an assessment of the feasibility of mountain biking in the Spearhead Area that considers:*
  - *The results of the above study on long-term impacts;*
  - *Direct and cumulative impacts on ecosystem values and visitor experiences in the Spearhead Area; and,*
  - *Trail design and maintenance standards.*

Section 6.2.4 - WINTER RECREATION [BACKCOUNTRY HUTS]

Management Issue

The 1990 Master Plan provides direction to study the concept of a hut-supported winter ski-touring route, including an assessment of the impacts to Mountain Goats. Although the 1990 Master Plan suggested that huts should be studied in detail, it was not explicit regarding whether or not huts were acceptable in the Spearhead Area of Garibaldi Park.

Through this plan amendment process, BC Parks has considered a hut system concept, by seeking public feedback regarding the acceptability of huts and by completing an assessment of Mountain Goat populations and habitat requirements in the study area.

BC Parks' assessment of huts in the Spearhead has also been informed by a proposal for a system of huts submitted by the Spearhead Huts Committee in spring 2012. In developing its proposal, the Committee carefully selected preferred hut locations based on considerations for winter and summer access, patterns of use, and safety.

Where a management planning document provides direction indicating that a fixed-roof accommodation facility such as huts are appropriate in a park, proposals for the development of such facilities may proceed to a competitive process, pursuant to *BC Parks Fixed Roof Accommodation Policy* (2006) and associated guidelines.

Summary of Comments Received

The public came out strongly in favour of a hut system. Many felt that huts and associated facilities provide an appropriate means to focus visitor impacts and use. There are concerns around public safety due to the complexity of the terrain, the need to limit the size and number of the huts, and the need to mitigate environmental impacts, in particular impacts to sensitive alpine habitats and wildlife. Another issue raised was the need to manage commercial use of the huts to ensure fair and equitable access. Many suggested a reservation system should be implemented, with limits on commercial bookings of the huts.

Respondents considered various levels of development - from those preferring rustic huts to those interested in seeing more intensively developed huts modeled after the Haute Route in the Alps and other European hut systems. Overall, the preference was for modest huts and not lodges. The public also emphasised the need for careful visitor management to avoid huts exceeding their capacity, and the need to provide waste facilities.

Respondents stressed the importance of maintaining affordable access for the public and preferred a not-for-profit model for hut operations. Respondents also emphasised the need for provision of public amenities at the huts including campsites, pit toilets, and cooking and emergency shelters.

While the majority of stakeholders were in support of huts in the Spearhead Area, some concerns were raised about the cumulative impacts of increased public use into more

remote areas of the park, safety issues - particularly in inclement weather - and ensuring the design and location of the huts minimise impacts to park viewscapes and alpine ecosystems.

Whistler Search and Rescue underscored the pressures a hut system could place on volunteer emergency responders and emphasised the need for a comprehensive safety plan.

Analysis

Given widespread indications of support for the hut concept, the plan amendment provides clear direction to allow huts. This includes provisions to ensure the location and is carefully considered to minimise environmental footprint and avoid impacts, in particular impacts to Mountain Goats and their habitat. The management direction also includes conditions that will be used to assess hut proposals to ensure that the hut system is safe and affordable for a spectrum of park visitors.

Management Plan Amendment

The following changes are proposed to section 6.2.4:

Delete the following strategy:

- *Study in detail the high route trail in the Spearhead Range linking the Blackcomb ski area and the Whistler ski area as a possible ski tour route supported by a hut system. Included in the study will be an assessment of impact on Mountain Goats.*

Replace with the following strategies:

- *Alpine huts are acceptable in the Spearhead Area under the following conditions:*
  - *Huts will be available to the public with fair opportunity to secure overnight accommodation. Proposals with lower overnight accommodation fees may be favoured.*
  - *Huts will provide modest facilities to support self-sufficient and self-propelled users.*
  - *Huts will be located and designed to accommodate winter ski-touring and may require the development of summer hiking trails connecting to the huts.*
  - *Huts proposals will be required to minimize impacts to park values by:*
    - *Minimising the size and number of huts.*
    - *Minimising air access required for servicing the huts.*
    - *Avoiding Mountain Goat winter range and alpine forage habitat adjacent to the Mountain Goat winter range (hut locations and construction will consider recommendations of the provincial Management Plan for Mountain Goat and may require detailed assessment to ensure impacts to Mountain Goat habitat are avoided).*

- *Including environmentally sustainable water management and waste management systems (including "pack in and pack out" requirements).*
- *Including a health and safety plan to address public health and safety associated with both the access to, and use of, the huts.*
- *Including a wildfire plan to address wildfire risk.*
- *Applying the BC Parks Impact Assessment Process (includes an assessment of impacts to alpine ecosystems and wildlife, visitor experiences and First Nations cultural sites and traditional uses).*

Section 6.2.5 - COMMERCIAL RECREATION SERVICES [HELI-SKIING]

Management Issue

In 1981 the Province issued a 30-year licence of occupation for heli-skiing in the Spearhead Area of Garibaldi Park. The 1990 Master Plan supported restrictions on all motorised access in Garibaldi Park, including aircraft access. However, a decision was made to allow heli-skiing to continue, an exception to the overarching vision for Garibaldi Park to be non-motorised. The heli-skiing permit was restricted to the geographic extent of the existing permit area held by Whistler Heli-Skiing.

Winter motorised use on lands outside the park in the Sea to Sky region has increased significantly since 1990. This use is placing pressures on non-motorised user groups who often feel displaced from areas with high levels of snowmobiling and heli-skiing use, making Garibaldi Park increasingly important as a non-motorised recreational destination.

In 2011, the heli-skiing permit expired and BC Parks granted a five-year renewal, expiring in 2016. This interim permit renewal allowed BC Parks the opportunity to seek input from the public, stakeholders, and First Nations regarding the future of heli-skiing in the park.

Summary of Comments Received

There was considerable interest in the question of heli-skiing, with differing opinions about the future of the tenure in the park. While the majority of public and stakeholders were strongly opposed to heli-skiing continuing in the park, there was also a number of tourism and business interests that expressed support for heli-skiing.

Many recreation and conservation stakeholders responding to the draft plan amendment were disappointed that it did not include direction to phase out the heli-skiing tenure within the park. The opposition to heli-skiing in the park was based on its inconsistency with the non-motorised vision for Garibaldi Park, conflicts with backcountry skiers, noise, emissions, carbon footprint, impacts to wildlife and a diminished sense of solitude and wilderness.

Supporters of heli-skiing cited its importance to tourism and the local economy. Resort partners support heli-skiing as an important resort business and product offering. The Resort Municipality of Whistler emphasized the importance of BC Parks and Whistler Heli-Skiing working to minimize ecological impacts, and working with relevant user groups to maximize user experience and safety, including development of a conflict avoidance protocol with the ski-touring community. Whistler Search and Rescue noted the importance of the heli-skiing operator in providing a measure of public safety by their presence in the area.

Analysis

Public feedback stated a strong preference for restricting Garibaldi Park to non-motorized activity and phasing out heli-skiing. Motorised access impacts the wilderness quality of the Spearhead Area and affects park visitors' quiet enjoyment of the park, both of which have been recognised as core values of the Garibaldi Park experience.

The Spearhead Area of Garibaldi Park is an increasingly popular destination for backcountry ski touring, an activity that attracts many visitors to the Whistler area. The proposed development of huts is considered to be a world-class backcountry skiing experience that will attract additional visitors to the Whistler area. The ski touring community has expressed concern that motorised heli-skiing access to the Spearhead detracts from the park experience and results in user conflicts. Furthermore, pressures from increasing motorised use in many other areas of the Sea to Sky region make Garibaldi Park all the more important as a non-motorised destination.

Heli-skiing has been a recreation opportunity in Garibaldi Park for 32 years. Heli-skiing is part of a unique experience that destination visitors to Whistler are seeking, combining one or two days of heli-skiing with an on-mountain experience. While the portion of the heli-skiing tenure within Garibaldi Park is a small percentage of the overall tenure area, it is important for providing a viable heli-skiing opportunity on days of marginal weather when other locations within their tenure do not.

Whistler Heli-Skiing provides an additional measure of public safety through their presence in the Spearhead Area. However, reliance on the heli-skiing operator to provide public safety in the park is not reasonable. BC Parks has protocols for managing backcountry safety in parks, including Garibaldi. If huts are developed in the Spearhead Area, BC Parks will require that a plan be developed that fully addresses all aspects of public safety for their access and use; this plan should not rely on the heli-skiing operator to provide public safety.

Overall, the populations of Mountain Goat in Garibaldi Park have declined from historic numbers, making the remaining goats highly vulnerable to disturbance. Mountain Goat is an easily stressed species and human use, in particular helicopter use, is known to cause distress and habitat avoidance in Mountain Goats. The provincial Management Plan for Mountain Goat provides recommendations for avoiding negative impacts to Mountain Goat, including recommendations related to the use of helicopters.

Surveys of Mountain Goat in the Spearhead Area in 2012 and 2013 indicate that the populations are relatively stable. This would suggest that under the current management regime, heli-skiing operations do not appear to be having a significant negative effect on Mountain Goat populations in the Spearhead Area of the park. This may be because helicopter access routes avoid goat winter range and a height of land separates the closest winter range from the heli-skiing permit area. However, these surveys were the first completed in the area since 2000, and combined with earlier surveys, the data set is not extensive enough to draw conclusions about whether or not the Spearhead population has increased or decreased over time. More information is required to understand long-term trends in Mountain Goat populations.

Wolverine is another species that occurs in the park and is known to be negatively affected by motorised use, although the status of populations in the Spearhead Area of the park is unknown. Further monitoring is required.

Management Plan Amendment

Add the following strategies:

- *Consider the future of heli-skiing in the park by monitoring and assessing the effects of heli-skiing on key park values, including public recreation activities, Mountain Goats and other wildlife.*
- *By no later than 2026, BC Parks will develop a recommendation on the future of heli-skiing that meets the vision of the park, and addresses impacts on key park values. The recommendation could include continuing, adjusting, or eliminating heli-skiing.*
- *BC Parks will work with the heli-skiing operator to ensure that their permit management plan includes protocols and restrictions to minimise user conflicts and impacts to Mountain Goats.*
- *No additional areas for heli-skiing within the park will be considered.*

In the interim, maintain the following strategy:

- *The heli-skiing opportunities will continue to be a recreation service offered in the park. However, no new areas will be considered within the park for additional heli-skiing.*

6. Implementation

Implementation Plan

The management of the Spearhead Area of Garibaldi Park will follow the direction outlined in this management plan amendment. The implementation of the outlined management strategies is subject to the availability of resources. As capacity allows, BC Parks will implement management strategies, starting with the high priority strategies outlined below.

High Priority Strategies

The following strategies have been identified as high priorities for implementation:

- Work with Whistler Blackcomb to develop public access rights-of-way through the Controlled Recreation Area.
- Work with adjacent land managers to establish a new vehicle-accessible trailhead on the north side of Fitzsimmons Creek to provide summer access to the Singing Pass Trail.
- Work with Whistler Blackcomb to develop a trail connecting from the Flute Summit to the Singing Pass Trail.
- Following the *BC Parks Fixed Roof Accommodation Policy*, solicit proposals for the development of huts in the Spearhead Area that meet the conditions outlined under Section 6.2.4.
- Work with partner ministries and other partners, to monitor and assess the effects of heli-skiing on key park values.

Appendix I

Hirner, J. (May 2013). *Potential Impacts of Proposed Recreational Activities on Mountain Goats, Spearhead Area of Garibaldi Park*. Prepared for BC Parks South Coast Region, Ministry of Environment, 7pp.

Potential Impacts of Proposed Recreational Activities on Mountain Goats, Spearhead Area of Garibaldi Park

Prepared by Joanna Hirner, Conservation Specialist, South Coast, BC Parks
May 2013

Introduction

Mountain Goats are a species of particular importance in British Columbia. The global distribution of Mountain Goats is limited to western North America, with over 50% of the world's population occurring in BC (MGMT 2010). Although Mountain Goats are not considered a species at risk (BC CDC 2013), within the Conservation Framework Mountain Goats are ranked Priority 1 (highest priority) for Goal 2: Prevent species and ecosystems from becoming at risk (BC Conservation Framework 2013). Recent estimates of population trends suggest that populations are stable-decreasing to decreasing in the Lower Mainland region (MGMT 2010; S. Rochetta, personal communication, May 22, 2012). Mountain Goats are sensitive to disturbance from human activities, and parks and protected areas are considered important for protecting goats from disturbance and habitat loss due to industrial development (MGMT 2010). However, recreational activities are also known to cause disturbance to Mountain Goats and may reduce habitat effectiveness, even in parks (MGMT 2010).

Mountain Goats occur in Garibaldi Park, including the Spearhead Area. Winter range habitat has been identified and mapped within the Spearhead Area, and recent winter surveys suggest that these habitats are well occupied with populations of Mountain Goats. The availability and use of habitat by Mountain Goats at other times of year within the Spearhead Area is less well understood. However, general knowledge of goat biology, qualitative assessment of habitat conditions, and GIS analysis of factors limiting habitat suitability, such as access to escape terrain, suggest that goats may use the Spearhead Area throughout the year. In particular, the Spearhead Area likely provides important habitat in the spring for the birth of kids, early rearing, and foraging, because these habitats are typically found within or close to goat winter ranges.

Recent GIS analyses also show that current and proposed human activities overlap with goat habitat. These overlaps have the potential to cause negative impacts to Mountain Goat populations in the Spearhead Area, because Mountain Goats are sensitive to disturbance from human activity, including recreation. This report provides a summary of what we know about Mountain Goat habitat and activity in the Spearhead Area, and a qualitative assessment of the risk of current and proposed recreational activities to Mountain Goats.

Mountain Goat Habitat and Use in the Spearhead Area

Mountain Goat Winter Range

The availability of suitable habitat in winter ("winter range") is an important limiting factor for Mountain Goat populations. Movements tend to be restricted in winter, likely due to the energetic costs of moving through deep snow. Habitat requirements in winter include access to escape terrain, and conditions that limit snow cover and improve access to forage, such as steep snow-shedding slopes and/or forest stand conditions that limit snow cover (MGMT 2010).

Two Mountain Goat winter ranges have been mapped in the Spearhead Area; one on the steep slopes on the north side of Fitzsimmons Creek watershed and one to the north and east of Cheakamus Lake. Winter aerial surveys were periodically conducted at these two winter ranges between 1978 and 2000, and every one of these surveys detected Mountain Goat activity (Schultz 2000; Table 1). More recently aerial surveys were conducted in March 2012 and 2013. The number of goats observed in 2012 was particularly high (Table 1): 9 (including 4 kids) at Fitzsimmons and 19 (including 6 kids) at Cheakamus. These numbers were higher than observed in the past on these winter ranges (particularly for Cheakamus), and were high relative to goat populations elsewhere in the region, which have generally been observed to be declining (S. Rochetta, personal communication, May 22, 2012). The number of kids was also notably high. For example, during winter aerial surveys in 1997 throughout Garibaldi Park, of 135 goats detected only 12 (9%) were kids (Schultz 1997). In contrast, 10 kids among 28 total represents 36% of the goats observed at Fitzsimmons and Cheakamus in 2012.

Numbers observed in 2013 were lower than in 2012, likely because a significant snowfall had occurred overnight, limiting detection of tracks and likely causing goats to remain under tree cover. Because conditions were suboptimal and a kid and a juvenile were among the goats observed on both winter ranges, there is no reason to believe that the population condition has changed between 2012 and 2013 on these two winter ranges (S. Rochetta, personal communication, March 18, 2013).

On provincial Crown Land where the *Forests and Range Practices Act* applies, identified Mountain Goat winter ranges are legally designated as Ungulate Winter Range because of the importance of suitable habitat in winter for Mountain Goats. Forest harvesting activities are only allowed through an exemption, and exemptions are normally only considered under certain conditions, e.g. where harvesting would enhance the quality of the winter range habitat or where there is a requirement for a road to be built and no other practicable options exist.

Table 1. Number of mountain goats counted during winter aerial surveys in the Fitzsimmons and Cheakamus winter ranges. Data from 1978 to 2000 taken from Schultz (2000).

Year	Number of goats Fitzsimmons	Cheakamus
1978	5	Tracks
1988	Tracks	Not surveyed
1990	2	Tracks
1992	6	2
1997	8	4
2000	8	8
2012	9 (including 4 kids)	19 (including 6 kids and 1 juvenile)
2013	6 (including 1 kid)	5 (including 1juvenile)

Spring Habitat for Birthing and Rearing of Kids and Foraging

Birthing of kids is highly synchronous and occurs between mid-May and mid-June. Birthing sites are generally widely dispersed within or near winter ranges, often in rugged, inaccessible cliffs but with limited precipitous habitat, and may occur near treeline within the forest. Steep terrain for escaping predators is important for goats throughout the year, but is particularly important during spring birthing (MGMT 2010).

Females disperse and isolate themselves from other animals just before birthing but rejoin other females and young in nursery groups within 5-14 days of birth. Habitats used for early rearing overlap with birthing sites. Groups of animals (excluding adult males) tend to form nursery groups shortly after nannies and kids leave the birthing sites; these groups typically begin moving upslope following green-up to their summer range. Summer range is important during the early rearing period and is typically associated with meadow-like openings that have rich forage and nearby escape terrain (MGMT 2010).

Given the above, Mountain Goats very likely occur on or near the Cheakamus and Fitzsimmons winter ranges during the birthing and early rearing period, and are likely to use suitable habitat upslope of these ranges for spring foraging. A 1989 review of goat observations throughout Garibaldi Park suggests that Mountain Goats in the park remain on winter range until at least late April (Blood 1989). Upslope of the Cheakamus winter range are areas of alpine meadows that are likely important as early rearing and foraging habitat during the spring and early summer period (S. Rochetta, personal communication, September 26, 2012). The Fitzsimmons winter range extends almost to the height of land on the north side of the Fitzsimmons watershed, and based on satellite imagery it appears that little suitable foraging habitat exists upslope of the winter range or on the immediate other side of the ridge to the north. However, it does appear that the upper slopes within the mapped winter range include suitable spring forage habitat.

Summer and Fall Habitat

Goat movements appear to be harder to predict in summer, but generally summer forage habitat includes alpine meadows with rich forage and nearby escape terrain. Areas within the Coastal Mountain-heather Alpine Biogeoclimatic (BEC) zone could be roughly classified as suitable summer forage habitat, because Alpine Meadows have been classified as the provincial "benchmark" (best) habitat for the growing season for Mountain Goats in the Coast and Mountains Ecoprovince (in which Garibaldi Park is located) (RISC 1999). However, some habitat within this BEC zone would not be vegetated (i.e. rock and ice rather than alpine meadows).

Summer habitat also requires access to summer thermal refugia and escape terrain. Thermal refugia are areas where Mountain Goats can protect themselves from overheating by seeking cover, in the form of topography (cliffs, scattered ledges, overhangs and caves) or conifer forest. Escape terrain is required all year and has been defined as slopes greater than 40º or 84%, shear or broken cliffs and usually rock substrate. Mountain goats are usually reluctant to venture more than 400-500 m from escape terrain, often less distance during winter. Thus quality habitat is provided by areas of forage interspersed with escape terrain (MGMT 2010).

One other habitat type that may be limiting is migration corridors between suitable habitats and seasonal ranges. Goats may establish trails within these connecting habitats. No such trails have been identified in the Spearhead Area. In the fall, Mountain Goats can be assumed to be travelling back to their winter range habitats in preparation for winter (Steve Rochetta, personal communication, March 18, 2013).

In general, very little is known about summer and fall habitat use and movements in the Spearhead. Only one aerial survey has been conducted in the Spearhead Area in late summer/early fall, on September 21,1987 (Jones 1988); this survey did not include the Cheakamus watershed. During this survey, map records indicate that three goats were observed on the south facing slopes between Blackcomb Peak and Decker Mountain, and five goats were observed on the south facing slopes below Tremor Mountain, at the eastern end of the Fitsimmons watershed. Although we do not have exact location coordinates for these observations, they appear to be within or just above the top boundaries of the mapped Fitzsimmons winter range.

To help predict areas of suitable summer habitat, Anders Hopperstead (GIS Analyst, Ministry of Forests, Lands and Natural Resource Operations) conducted an analysis which identified escape terrain within the Coastal Mountain-heather Alpine Biogeoclimatic (BEC) zone and then buffered the escape terrain by 500 m to create a summer habitat GIS layer. Based on this analysis, summer habitat appears to be widely available within the Spearhead Area. However, the analysis did not account for the fact that much of the identified potential habitat is not vegetated. The detailed vegetation data required for this type of analysis is not currently available, but a qualitative analysis of satellite imagery suggests that suitable foraging habitat may be much more limited than the current analysis suggests, because many areas appear to be rock with little vegetation.

Potential Impacts and Risks of Existing and Proposed Recreational Activities within the Spearhead Area

GIS analysis

In January 2013 Anders Hopperstead completed GIS analyses to determine whether the existing and proposed recreational activities being considered as part of the Management Plan Amendment for the Spearhead Area were compliant with the recommended buffer distances as described in the *Management Plan for the Mountain Goat (Oreamnos americanus) in British Columbia* (MGMT 2010). These recommended buffer distances are based on the best available science for Mountain Goats and are meant to protect Mountain Goats from disturbance from human activities. The results were as follows:

a) *Helicopters should be kept 2000 m (horizontal distance) and 400 m (vertical separation) from Mountain Goat habitat.*
The boundaries of the current heli-skiiing permit area are within 2000 m of the Fitzsimmons winter range, and within as little as 100 m in some areas. According to the Mountain Goat management recommendations (MGMT 2010), the horizontal distance may be reduced where topographic features prevent "line of sight" viewing to the area of Mountain Goat habitat. There is a height of land between the Fitzsimmons winter range and most of the heli-skiing permit area, which can be assumed to mitigate to some extent the impacts of heli-skiing on Mountain Goats in the Fitzsimmons winter range.

b) *Maintain a 500 m buffer zone adjacent to important Mountain Goat habitat (including winter range and kidding/early rearing areas) for industrial development, which includes trail development.*
The draft locations for trails and backcountry huts at the time of the Management Plan Amendment process were used for this analysis. Although trails and huts do not fit the description of industrial development in the long-term, during construction they could have attributes of industrial development such as noise, tree cutting, machinery, etc. The GIS analyses showed that the proposed Russet and Pattison backcountry hut locations and part of the proposed Singing Pass Connector Trail are within this zone. However, more recent assessment of the proposed Singing Pass Connector suggests that this trail is likely not feasible. The proposed summer route trail on the north side of the Spearhead is entirely within the boundaries of the Fitzsimmons winter range.

c) *Maintain a 100 m buffer between important goat habitat and non-motorized recreational activities. Locate facilities and trails away from these habitats.*
As stated under (b), the proposed summer route trail on the north side of the Spearhead is entirely within the boundaries of the Fitzsimmons winter range. The proposed campsite at Mount Pattison and part of the proposed Singing Pass connector trail are also within this buffer. However, more recent assessment of the proposed Singing Pass Connector suggests that this trail is likely not feasible.

Potential impacts and risks

a) *Heli-skiing:* We do not know to what extent the height of land between the heli-skiing permit area and the Fitzsimmons winter range provides mitigation for the impacts of helicopters on Mountain Goats. The fact that the Fitzsimmons winter range has been

occupied during all winter aerial surveys conducted since the 1970s suggests that goats are able to coexist with the adjacent heli-skiing, likely because of the height of land separation. However, the existing data do not allow assessment of whether or not helicopter activity has had other impacts on Mountain Goats. For example, although goats appear to be consistently present, we do not know if their population would be higher if heli-skiing were not occurring nearby.

b) *Proposed trails:* The fact that the summer route on the north side of the Spearhead Area crosses the upper slopes of the Fitzsimmons winter range is particularly problematic and poses several potential risks to Mountain Goats. Although the route would not be used in winter, it is possible that this area is important for goats outside of winter, particularly during birthing, early rearing, and foraging. Mountain Goats would be particularly sensitive to disturbance during spring because of the presence of new kids and because of nutritional stress at the end of winter. The potential for impacts to kidding terrain is also particularly problematic because Mountain Goats have a naturally low reproductive rate and survival of kids is low. Seasonal closures of the trail during the spring period potentially could mitigate impacts, but closures would be difficult to enforce. The physical changes on the landscape due to trail construction and maintenance could also affect the quality of goat habitat year-round, especially if tree removal were required for the trail.

c) *Proposed huts and associated campsites:* The recommendations in the Mountain Goat Management Plan (MGMT 2010) suggest that some of the proposed locations for huts and campsites may be too close to important goat habitat. An additional important aspect of assessing the risk of these facilities is that they will have a zone of influence larger than their location, especially if there are lines of sight to important goat habitat or if the terrain adjacent to facilities invites people to wander. The proposed location of the Russet Hut was identified as being problematic in part for these reasons, and was visited in September 2012 for further assessment. During that site visit other potential hut locations (including the existing hut at Russet Lake) were identified that were further and out of sight from the alpine meadow foraging habitats directly upslope from the Cheakamus winter range. The existing Russet Lake site is likely the best alternative location for mitigating impacts to goats, because it is relatively far from the Cheakamus winter range, has already experienced impacts, and limits the increase of human footprint in the area.

Information Needs

Additional information about spring and summer habitat availability and use in the Spearhead Area would help to determine which areas are most important to Mountain Goats year round, and to confirm that the upper slopes of the Fitzsimmons winter range are used in spring and summer. This information could also be used to determine if summer habitat is widely available or limited in the Spearhead Area. Understanding more about the location and availability of spring and summer habitat would allow us to better assess the risk of recreational activities to Mountain Goats and to locate trails and other facilities and uses in areas least likely to cause impacts. Spring and summer field surveys (aerial and/or ground) of goats and goat habitat attributes would help provide this information.

Conclusion

The risks of current and proposed recreational activities to Mountain Goats in the Spearhead Area cannot be precisely quantified, but there is a risk of negative impacts. Mountain Goats are known to be easily stressed and disturbed by human activities, including non-motorized recreation. Recent surveys suggest that healthy and reproducing populations of Mountain Goats exist in the Spearhead Area, but elsewhere in the region, Mountain Goat populations appear to be declining. Stressors to Mountain Goats such as industrial activity and motorized recreation are widespread outside the park, and climate change will likely further stress Mountain Goats in the future, which increases the relative importance of undisturbed habitats and the Mountain Goat populations they support. For example, healthy goat populations in the park could be sources for maintenance and recovery of populations outside the park. Because the Spearhead populations occur very close to the community of Whistler and heli-skiing already occurs close by, these populations may already be under a certain level of stress, and the effects of additional facilities and activities may be cumulative. If the goal is to maintain healthy populations of Mountain Goats in the Spearhead Area of Garibaldi Park, recreational activities should be planned and managed to minimize impacts to Mountain Goats. Applying a precautionary approach to management, this would include phasing out activities with potential negative effects, and locating facilities to avoid important Mountain Goat habitat.

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Notes on Mountain Goats and Heli-Skiing Permit Renewal

October 13, 2015

Joanna Hirner

Background from Management Plan Amendment for the Spearhead Area

Mountain goat populations in the South Coast region are generally thought to be stable to declining. Mountain goats are known to be sensitive to human activity, in particular motorised activity such as snowmobiles and helicopters. Increasing motorised use (snowmobiling, heli-skiing, cat skiing, etc.) and industrial activity outside the park, and increasing non-motorised recreation throughout the Sea to Sky region, can be assumed to be increasing negative pressures on mountain goats. Increased disturbance outside the park presumably increase the regional importance of Garibaldi Park and its goats and goat habitat, due to relative lack of disturbance in the park. For example, healthy goat populations in the park could be sources for maintenance and recovery of populations outside the park.

Mountain goats are particularly sensitive to negative impacts of human activity during winter. Suitable habitat is particularly limiting, and movement is more difficult during winter because of the energetic costs of moving through deep snow. Suitable habitat in winter includes steep escape terrain and conditions that favour lower snow-packs such as steep snow-shedding slopes, forest stand conditions that limit snow cover, and south facing slopes that receive more sun. A goat winter range has been identified and mapped on the steep slopes on the north side of the Fitzsimmons Creek watershed (referred to herafter as the "Fitzsimmons winter range"). See Figure 2 in the *Management Plan Amendment for the Spearhead Area* for mapping of goat winter range.

The BC Government's *Management Plan for the Mountain Goat in British Columbia* (published in 2010) recommends that helicopters should be kept 2000 m (horizontal distance) and 400 m (vertical separation) from mountain goat habitat. The boundaries of the current heli-skiing permit area are within 2000 m of the Fitzsimmons winter range, and within as little as 100 m in some areas (see Appendix 1). However, the *Management Plan for the Mountain Goat...* also states that the horizontal distance may be reduced where topographic features prevent "line of sight" viewing to the area of mountain goat habitat. There is a height of land between the Fitzsimmons winter range and most of the heli-skiing permit area, which can be assumed to mitigate to some extent the impacts of heli-skiing on Mountain Goats in the Fitzsimmons winter range.

Recent surveys (2012 and 2013) suggest that healthy and reproducing populations of mountain goats occur in the Spearhead area, including the Fitzsimmons winter range. The fact that the Fitzsimmons winter range has been occupied during all winter aerial surveys conducted since the 1970s suggests that goats are able to coexist with the adjacent heli-skiing, likely because of the height of land separation. However, the existing data do not allow assessment of whether or not helicopter activity has had other impacts on mountain goats. For example, although goats appear to be consistently present, we do not know if their population would be higher if heli-skiing were not occurring nearby. Because the goat populations in and around the Spearhead occur very close to the community of Whistler and heli-skiing already occurs close by, the goat populations may

already be under a certain level of stress, and the effects of different disturbances may be cumulative. Climate change may increase the stress on these populations.

Wolverine is another species that occurs in the park and is known to be negatively affected by motorised use. However, the status of populations in the Spearhead Area of the park, and the extent and importance of wolverine use of the area in and around the heli-skiing permit area, is unknown.

Section 6.2.5 of the Management Plan Amendment added the following strategies:

- *Consider the future of heli-skiing in the park by monitoring and assessing the effects of heli-skiing on key park values, including public recreation activities, Mountain Goats and other wildlife.*
- *By no later than 2026, BC Parks will develop a recommendation on the future of heli-skiing that meets the vision of the park, and addresses impacts on key park values. The recommendation could include continuing, adjusting, or eliminating heli-skiing.*
- *BC Parks will work with the heli-skiing operator to ensure that their permit management plan includes protocols and restrictions to minimise user conflicts and impacts to Mountain Goats.*
- *No additional areas for heli-skiing within the park will be considered.*

The third strategy is the most immediately applicable to the current discussions regarding permit renewal. Here are some preliminary considerations for potential inclusion in the management plan of the renewed permit:

- Helicopters should avoid the Fitzsimmons winter range when flying to and from the permit area. Specifically, they should stay on the north side of the ridge that separates their permit area from the Fitzsimmons winter range, and should not fly up the Fitzsimmons Valley for access to and from their permit area.
- To comply with the recommendation of the *Management Plan for the Mountain Goat in British Columbia* that helicopters should stay 2000 m horizontal distance from goat habitat, the permit area would need to be reduced, by quite a large amount in some areas (see Appendix 1). Because of the height of land in between the permit area and the Fitzsimmons winter range, this full reduction is likely not necessary, but it may be worthwhile to consider reductions in some areas, especially where the permit area comes within a few hundred metres of the winter range. Areas where the permit area may be visible to goats on their winter range, or where access requires flying close to the winter range, would be priorities to remove from the permit area. The proximity of the permit area to other goat winter ranges should also be considered (note that the permit area is also within 2000 m of two other goat winter ranges; see Appendix1).
- If goats or wolverines are encountered during flights, helicopters should maintain an appropriate separation distance between aircraft and animals (500 m line-of-sight is a recommended minimum distance for large wildlife in general, and a vertical separation of 400 m should be maintained). Helicopters should also take immediate action to increase separation distances, especially if animals react to the aircraft.

- The permittee should report all sightings of goats or wolverines or their tracks observed during flights. Data to record should include location, number of animals, and notes on animal behaviour wherever possible.
- We should look for examples of heli-skiing tenures on Crown Land outside of parks that have special provisions to protect goats, and potentially incorporate these into Park Use Permit special provisions. Contacts in the regional FLNRO offices should be able to provide advice on this.
- Mountain goats birth their kids in the spring, usually on or adjacent to their winter ranges. May 1 is defined as the beginning of the kidding season in the *Management Plan for the Mountain Goat in British Columbia.* If the permittee's current operating season extends into the spring past May 1, there may be a need to consider restrictions on the length of operating season and/or restrictions on permit operating area during spring.
- In the longer term and to address the first two strategies above, BC Parks should develop a strategy for monitoring impacts of heli-skiing on mountain goats and other wildlife. We will need to enlist partners such as FLNRO biologists to help us design and implement the monitoring strategy. There may be a role for the permittee in assisting with this monitoring, for example by collecting data during flights, some other in-kind contribution, or by contributing financially to monitoring.

Appendix 1. Map of Spearhead Area including locations of mountain goat winter range, heli-skiing permit area, and overlap of 100, 500, and 2,000 m buffers on goat winter ranges.

Comments for Whistler Heli-skiing Permit Management Plan

February 26, 2016

Joanna Hirner, Conservation Specialist, South Coast Region

Generally, the Whistler Heli-skiing Permit Management Plan contains some good commitments to practices that should avoid and/or mitigate impacts to mountain goats, wolverines and other wildlife. In addition, adjustments to the permit area, particularly in the Quiver area, should reduce the risk of impacts to the adjacent mapped goat winter ranges. However, I think some commitments should be more clearly stated, and additional practices should be adopted and described to increase the probability that impacts to wildlife and the environment will be avoided and/or mitigated.

Some specific comments and recommendations:

1. The Ministry of Environment's **Wildlife Guidelines for Backcountry Tourism/Commercial Recreation in British Columbia** (BCMoE 2006) contains guidelines specific to aerial related recreation. Although the current management plan is consistent with these guidelines in many ways, the management plan should generally reference and commit to practices consistent with these guidelines. In addition, specific practices (referred to in the Wildlife Guidelines as "desired behaviours") that are particularly relevant should be described and committed to in the management plan. Some of these specific practices are highlighted in the comments that follow.

2. Helicat Canada has **Best Practices for Sustainability** (BCHSSOA 2003) include recommendations and practices for avoiding and mitigating impacts to wildlife. Some of these specific practices are also highlighted in the comments that follow.

3. **Flight paths and wildlife avoidance**: Choosing standardized flight paths that avoid known wildlife habitat and adjusting flight paths to avoid wildlife encountered during flights are important for reducing impacts to wildlife. There are commitments to undertake such practices in several places within the management plan. However, these commitments could be more clearly organized and stated, and there are additional practices that I recommend adding to the management plan. Specifically:
    a. From Section 3.2.2 it sounds like the preferred and standardized flight path into the Spearhead permit area is by Wedge Creek on the north side of Phalanx Ridge. It would be helpful to show this general path on a map in the management plan.
    b. Are there situations where a flight path other than via Wedge Creek would be used? If so, other preferred alternatives should be described and identified on a map if possible.
    c. The plan should clearly commit to avoid flying directly over the four mapped goat winter ranges areas shown in Figure 4, particularly at low elevations, unless necessary for safety reasons.
    d. The Management Plan for the Mountain Goat in BC (MoE 2010) recommends a minimum 2000 m horizontal separation and 400 m vertical separation of helicopter flights from mountain goat habitat, which is consistent with one of the animal avoidance strategies in the management plan. Where flights need to occur closer to mountain goat habitat, the Management Plan for the Mountain Goat in BC (2010) recommends the following mitigation strategies: use of topographic barriers to separate helicopters from

mountain goats; keep helicopters below mountain goats if possible; avoid flying directly towards, hovering near, or landing near mountain goats; and minimize the number of flights and time spent within disturbance space. These practices should be described in the management plan and followed if goats are encountered or flights into goat habitat are necessary.

e. The mapped goat winter range on the north side of the Fitzsimmons drainage is less than 2000 m horizontal distance from the boundary of the permit area. The height of land in between the permit area and the Fitzsimmons winter range is a topographic barrier that should mitigate the potential impact of helicopter disturbance, but to prevent further disturbance to goats, pilots should avoid flying over the south side the ridge that separates the permit area from the Fitzsimmons winter range.
f. The Wildlife Guidelines (BCMoE 2006) include the following "desired behaviours" (paraphrased or quoted here) that should be added to section 8.1.2:
    i. Take immediate action to increase separation distances when animals react to aircraft.
    ii. Use consistent flight paths, preferably in the center of valleys, or the valley side opposite key wildlife habitat (i.e. goat winter range). If key wildlife habitats are in the center, fly on one side of the valley rather than the center.
    iii. Identify and use regular and predictable patterns and distribution of flights.
    iv. Stay at distances sufficient to prevent changes to the behaviour of animals. More than 500 m line-of-sight is the default for most wildlife (but as described above, the distance should be greater for mountain goats).
g. The Helicat Canada Best Practices for Sustainability (BCHSSOA 2003) include several additional recommendations (paraphrased or quoted here) that should be incorporated in Section 8.1.2 (there are similar practices already described in the management plan but these are more comprehensive and explicit):
    i. Use wildlife observations and monitoring to adjust flight paths to avoid areas where animals are regularly observed. Use information from previous day's observations to plan the subsequent day's travel routes
    ii. In management plans and operational policies, identify specific flight vectors (speed, elevation, distance, rate of climb/descent, etc.) that will be used to minimize disturbance of animals when they are known (or suspected to be) in specific habitats. Avoid any situations where animals may be surprised by the sudden appearance of aircraft.

4. **Reducing wildlife impacts associated with ground-based activities**: The Wildlife Guidelines (BCMoE 2006) recommend the following best practices for non-motorized recreation in winter, which should be included in the management plan and followed by guides and skiers:
    a. Pack out all garbage.
    b. Use existing facilities for human waste, pack it out, or bury it in deep snow at least 100 m from water sources.
    c. Remain still or retreat when animals are encountered and react to your presence.
    d. Stay at distances sufficient to prevent changes to the behaviour of animals (at least 100 m in open areas is the default for large mammals).

5. **Wildlife reporting**: As recognized in the Helicat Canada Best Practices for Sustainability (BCHSSOA 2003), wildlife inventory and monitoring data are important for mitigating and avoiding potential impacts to wildlife. For this reason, recording wildlife observation data needs to be a priority for pilots/guides wherever possible.
   a. The following data should be recorded when wildlife are observed from the air or on the ground: date, type (species) and number of wildlife, location (with spatial coordinates), aspect, elevation, the type of habitat, and comments on animal behaviour and response to disturbance. Most of these data are already included in the current protocol described in the management plan, which is great. If wildlife tracks are observed and can be identified as ungulate or carnivore, this would also be useful to record.
   b. Wildlife observation data should be used to adjust flight paths, identify areas and habitats where wildlife are commonly or occasionally sighted, and plan travel routes in the air and on the ground that minimize overlaps with wildlife. This data can be used on a daily basis to plan trips, and over the longer term to identify areas frequented by wildlife that may need to be avoided or where activities may need special management.

6. **Wolverine and grizzly bear:**
   a. The grizzly bear population within the Garibaldi-Pitt population unit was estimated at 2 bears in 2012 (BCMFLNRO 2012) so encountering a grizzly bear or bear den seems unlikely. Nonetheless, if a grizzly bear is observed, Whistler Heli-skiing should notify BC Parks as soon as possible, and the area of observation avoided pending consultation with a grizzly bear biologist (the area may include a den).
   b. Wolverine encounters are more likely given that wolverines are known to occur in the Spearhead. Wolverines use dens to birth and nurse and shelter cubs which are born in late February to mid-April and remain in the den for 8-10 weeks. Dens may be constructed under snow in the alpine and subalpine, and are often built where rocks, logs or fallen trees add structure to support the den (BCMWLAP 2004; Wolverine Foundation 2016). Repeated encounters with wolverine in an area may indicate the presence of a den and such an area should be avoided for skiing, and flying and landing helicopters. In a situation where a den is suspected, BC Parks should be notified as soon as possible, and the area of observation avoided pending consultation with a wolverine biologist.

7. **Spotted owl:** As the management plan implies, it is unlikely but possible that spotted owls would be encountered. In the unlikely event that a spotted owl is encountered, the encounter location should be assumed to potentially be a nesting area and avoided for helicopter flights (the 2004 Recovery Strategy for the Northern Spotted Owl [Chutter et al. 2004] suggests that spotted owl are potentially disturbed by noisy activities such as low-flying helicopters. BC Parks should be notified as soon as possible if a spotted owl is encountered, and a spotted owl biologist can be brought in to confirm that nesting is occurring and whether further avoidance is necessary.

8. **Section 8.1.1 (Wildlife Impacts)**: The second paragraph of this section appears to suggest that evidence is inconclusive and unclear for human disturbance impacts on wildlife related to recreation. However, it is well established elsewhere in the literature that many animals, in particular mountain goats, are disturbed by helicopters and other human recreational activities (e.g. see literature cited in BCMoE 2006). Thus the second paragraph in this

section is misleading and should be removed. Similarly, the second to last paragraph in this section states that there is no evidence to suggest that heli-skiing activities have any significant impact on wolverines. However, literature cited in the COSEWIC assessment of wolverines (COSEWIC 2003) suggests that recreational activities during the late winter denning period may result in disturbance to females and their litters leading to relocation or abandonment, and human recreation that includes snow travel, including backcountry skiing, appears to disturb denning wolverines. Thus the statement of "no evidence of significant impacts on wolverine…" is also misleading and should be removed.

9. **Whitebark pine:** This species is listed as Endangered on Schedule 1 of the Federal Species at Risk Act and has been observed in the Spearhead area. The Canadian Wildlife Service has mapped candidate critical habitat which overlaps the entire permit area. Although heli-skiing is unlikely to damage trees or critical habitat for this species, it is important to know that the permit area is within critical habitat for this species and no whitebark pine trees should be damaged or removed associated with heli-skiing activities.

10. **Staff training**: Section 8.1.2 references inclusion of wildlife mapping and known habitat in training of pilots and guides. It may already be the case that training is more comprehensive than described, but to be clear, the training should include all aspects of practices to avoid impacts to wildlife and the environment (i.e. not just mapping of habitat), and the description of training in management plan should be updated to reflect this.

11. **Spill response**: There is a risk of fuel spills associated with helicopter use. Although this is likely already part of standard practice, the management plan should describe or reference spill emergency response procedures. This should include helicopters carrying equipment for emergency spill response and pilots being trained in how to use it.

12. **Other (more minor) comments**:
    a. Please include a literature cited list for the citations in the management plan.\
    b. Additional wildlife species of note to include on the species list and known in alpine-subalpine of Garibaldi Park include ptarmigan and wolves.
    c. On page 8 in the description of Biogeoclimatic subzones, the way the Alpine Zone is classified in the Biogeoclimatic Ecosystem Classification system has changed from what is described in the management plan. Alpine areas on the BC coast (including the permit area) are now classified as the Coastal Mountain-heather Alpine Zone. Currently there are no subzones or variants classified within this zone. See the following link for more information: https://www.for.gov.bc.ca/hre/becweb/resources/classificationreports/alpine/index.html.
    d. There appear to be a couple of type-os on p. 18: fourth bullet, suggest "that allowing" should read "that will allow", and fifth bullet, suggest "minimize avoidance and impacts" should read "avoid and minimize impacts".

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Mechanized Ski Guiding Management Plan

Permit Number: 102529

Management Plan

For

Whistler Heli-Skiing Ltd

This Management Plan has been approved by:

Whistler Heli-Skiing Ltd	Ministry of Environment Parks and Protected Areas South Coast Region
Date: July 13, 2016	Date: _____

Table of Contents

1.0 Introduction

This Management Plan has been prepared by Whistler Heli Skiing Ltd (WHS) for submission to BC Parks, as part of WHS's requirements pursuant to its existing Park Use Permit – PUP (102529), to request a renewal of its existing PUP dated October 2011, for a further 10 year term, to operate a commercial mechanized ski guiding operation within the Spearhead Range in Garibaldi Provincial Park.

WHS is an existing heli ski operator and has been providing guided heli ski tours within Garibaldi Provincial Park continuously since 1979. The company is owned by Whistler-Blackcomb Holdings (WB). The following management plan is an updated and revised version of the company's current management plan, and outlines WHS's use of the PUP area, a description of the operating area and recreation activities, historic and projected levels of use and an outline of other PUP activities, as well as public recreation and environmental values and uses, within WHS's PUP operating area.

This management plan conforms to the management plan schedule criteria, as stated in the current PUP, as well as the goals and objectives of the Garibaldi Provincial Park Master Plan (amended 2014). Every year, an annual report is submitted to BC Parks which outlines heli-skier utilization, interactions with public and wildlife observations.

1.1 General Overview of the Business

WHS has been providing guided heli-ski tours in the Spearhead Range of Garibaldi Provincial Park, east of the Resort Municipality of Whistler, for over 35 years. In addition to the PUP, the company also has a License of Occupation to conduct guided heli skiing activities on Crown land outside of the park.

Management Goals and Objectives**:**

- WHS recognises that provincial parks are "special places" and have to be managed in a manner that protects the values for these areas in the long term. In addition, provincial parks exist for the benefit of many user groups and the management objectives, as stated in the PUP, are to ensure that all of the user groups can co-exist within the Park.

- WHS is committed to environmental compliance and open dialogue with other users.

- WHS is ready and available to utilise their considerable resources for all types of emergency situations that may arise within the Park. There have been numerous incidents over the years where WHS has "rescued" lost skiers and snowboarders who started within the ski area boundaries and became lost.

- WHS will make every effort to ensure that the heli skiers who ski in the Spearhead zone are aware that they have the privilege of skiing within Garibaldi Park.

1.1.1 Garibaldi Provincial Park Master Plan

The Master Plan for Garibaldi Provincial Park (approximately 194,000 ha) was adopted and approved in September 1990 and amended in 2014 for the Spearhead area.

The Amended Master Plan contains a number of strategies to be monitored until 2026 including a provision for heli-skiing. Specifically, the interim strategy states "*the heli-skiing opportunities will continue to be a recreation service offered in the park. However, no new areas will be considered within the park for additional heli-skiing"*

It is the view of WHS that its activities are in compliance and consistent with the objectives and recommendations of the Master Plan for GPP, and therefore it is now seeking a renewal of its existing Park Use Permit.

1.1.2 Nature and Type of Tenure

WHS currently has a PUP (#102529) for a five (5) year period, effective October, 2011 and expiring in October, 2016. The company is requesting a renewal of its PUP for a further 10 year term.

The purpose of this PUP is to conduct a commercial mechanized ski guiding operation within Garibaldi Provincial Park during the fall/winter season from September 1st to April 30th of each year.

1.2 Proponent

WHS is a BC incorporated company and is based out of Whistler, BC. WHS is owned and operated by Whistler Blackcomb Holdings, which is responsible for all operational, financial and marketing aspects of the company. The company is an accredited member of HeliCat Canada (HCC) and all of their lead guides meet the operational guidelines of HCC regulations and requirements.

1.2.1 Corporate Summary

Incorporation Number: # BC0778527

Business Address: 4545 Blackcomb Way, Whistler, BC V0N 1B4

Corporate Officers:

- Dave Brownlie, Director, President and Chief Executive Officer
- Jeremy Black, Director, Senior Vice President and Chief Financial Officer

Contact: Mike Sadan, General Manager

Contact: whistlerheliskiing@whistlerblackcomb.com
www.whistlerheliskiing.com
Telephone: 604 – 905 – 3337
Fax: 604 – 905 – 2070

2.0 General Description of the Operating Area

2.1 Location and Access

WHS's operating area within Garibaldi Provincial Park is directly east of Blackcomb ski area (see Figure 2 – 1). The Park Use Permit area (Figure 2 – 2) includes ski terrain that is located predominantly on north aspects, above the 1200 m elevation, due to snow quality and snow stability characteristics. Most of the ski terrain generally ranges in elevation between 1700 m (5500') and 2400 m (8000'). Low elevation ski zones are usable only for limited periods in mid-season, when temperatures are at their lowest and the snowpack is deep.

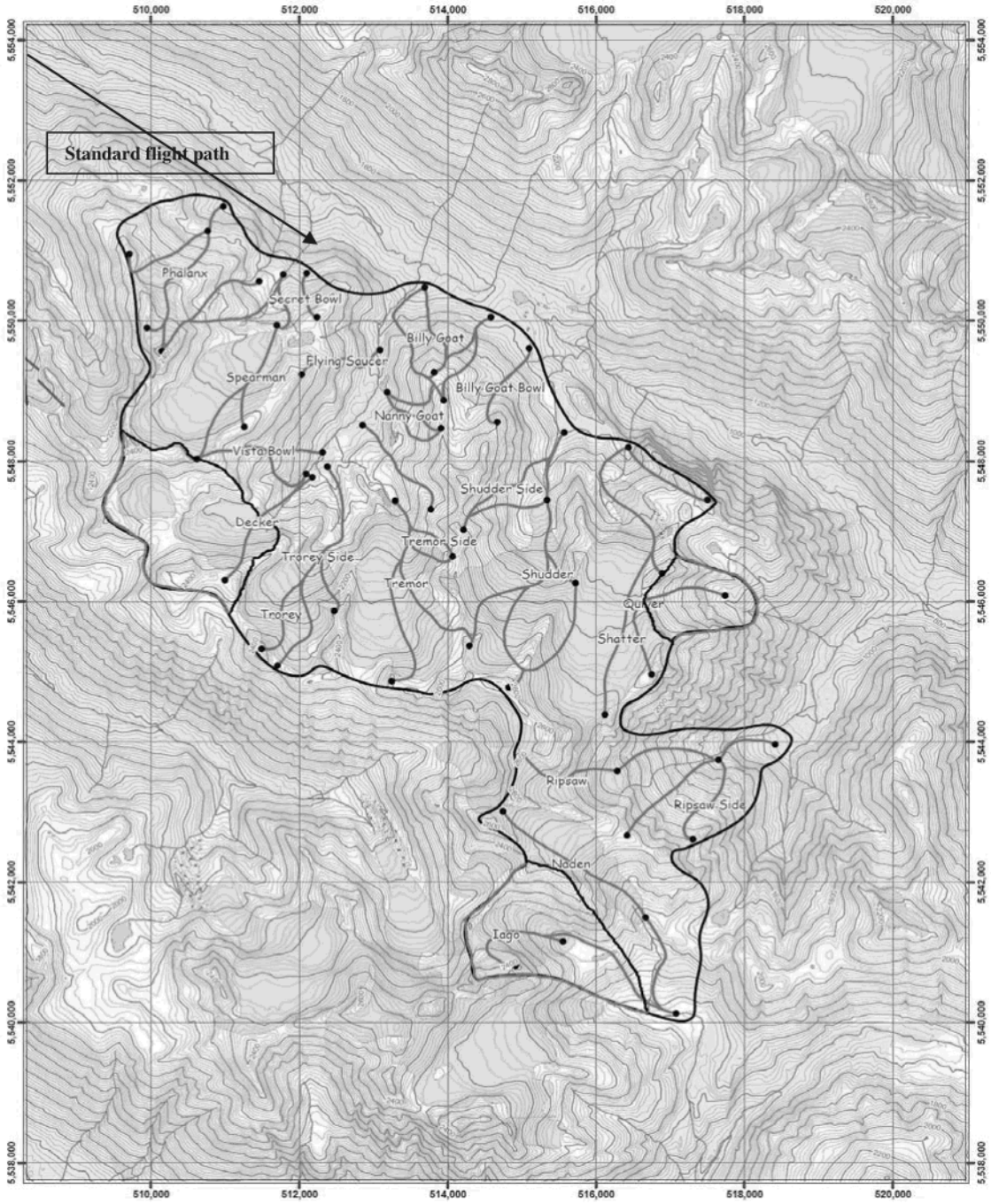
Access to the skiing terrain is provided via helicopter, directly from the Whistler municipal heliport.

Figure 2 – 2 illustrates the PUP boundary that WHS is proposing. In 2011 we reduced our usage from 5231ha to 5099ha and the current proposal reduces it to 5057ha with three less glaciers.

It is our view that the overwhelming majority of public ski touring does not travel east of the more frequented Decker Glacier and so we have offered to remove Decker Glacier from our operating area after the 2016 season. We also propose removing Iago Glacier on the other end of the permit area as a further concession to ski touring. We have removed the Quiver area to minimize any concerns with goat habitat in the Billy Goat Creek area.

Figure 2 – 1 General Location Map

Legend:
Yellow line is general heli-skiing area.
Green shaded area is Garibaldi Park.



Spearhead PUP Area – WHS (2016)
Scale 1:50,000 contour interval 20 meters
Legend:
Green Lines: Previous PUP Boundary, removed for 2016-17 season.
Black line: Revised PUP boundary
Orange Lines: standard ski run lines
Black dots: Most common drop off and pickups.

2.2 Description of PUP Operating Area Zone

2.2.1 Description of Operating Area

The Spearhead Range falls within the Eastern Pacific Ranges (near the transition to the Southern Pacific Ranges) Ecosection of the Coast and Mountains Ecoprovince and physiographic region (Demarchi 1995, Province of British Columbia 1992). The climate in this area, of steep Coastal Mountains, is significantly influenced by the Pacific Ocean, with high precipitation and a very deep snowpack.

The general area is characterized by vegetation communities that reflect their high (1200 m plus) elevation. The sub-alpine (between approximately 900 m and 1600 m) in this area is characterized by a leeward variant of the moist, maritime Mountain Hemlock sub-zone (MHmm2). While mountain hemlock is the identified climax species, other tree species common in this sub-zone include amabilis fir, yellow cedar, western hemlock, and western red cedar. Alpine areas (above approximately 1600 m) are characterized by an alpine tundra zone of the coastal variant (ATc). Alpine vegetation is dominated by hardy, low-growing shrubs, herbs, mosses and lichens, with krummholz tree species including Engelmann spruce; sub-alpine fir, mountain hemlock, and white bark pine growing only at the lowest alpine elevations.

2.2.2 Description of Ski Terrain

The Spearhead area (within the PUP area) contains eight, mostly north facing glaciers, lined up right next to each other at a high elevation (2500 m +). These wide open terrain features, with appropriate slope and aspect, are considered classic heli skiing terrain that can accommodate many people with various skiing abilities. The terrain is very close to the Whistler Heliport, allowing quick, easy access for WHS's clients.

The ski terrain within the PUP is deemed to be WHS's prime ski location, and also offers excellent skiing opportunities in a variety of weather conditions. In addition, several of the key glaciers within the Spearhead area offer relatively "simple" terrain, with reduced exposure from above, low angle slopes, and wide open snowfields. This allows WHS to ski this terrain with low risk, even during periods of elevated avalanche hazard.

3.0 Commercial Recreation Activities within PUP

3.1 Description of Activities

Whistler Heli Skiing Ltd. is the primary operating company for all heli-skiing activities in the Whistler area. It has one office; located in the Carleton Lodge. Clientele is drawn from visitors to the Resort; with the majority of them being day heli-skiers. The nature of this type of heli-ski operation makes it highly dependent on the weather. Seasonal and annual fluctuations in skier visits can occur as a result of market conditions and variable weather conditions. The company uses the Whistler Municipal Heliport as the main base of operations. It is located approximately 8 km north of the village of Whistler, on the Sea to Sky Highway # 99.

There are two basic types of heli-skiing clients targeted by the industry. The first type is the daily heli-skier, the second is weeklong lodge based which is the most common. Daily heli-skiers are visiting the Whistler Resort and wish to heli ski as part of their resort experience. It is an activity that is promoted world-wide by Tourism Whistler and Whistler Blackcomb. Heli-skiing appears to be one of the reasons that many visitors choose Whistler as a winter destination rather than choosing one of the many American or European resorts that do not have heli skiing. This day-ski visitor comprises approximately 95% of the total heli-ski clientele for WHS and we are likely the world leader in this sector.

3.1.1. Typical Daily Operation

Heli-skiing clients reserve from a few months to 24 hours in advance at the WHS reservation locations in Whistler Village. On their first day of heli-skiing, visitors sign in at the office, complete their waiver and skiing level documents, and then are transported by company bus to the Whistler Municipal Heliport.

Prior to take-off, clients are given a safety orientation briefing during which they are made familiar with avalanche rescue & helicopter safety procedures.

The most common helicopter servicing this area is the Bell 212 and typical group sizes are up to 10 guests with a maximum of 3 groups and one guide leading each group. Normally there will also be one tail guide per helicopter as well as a cameraman who films the day. On occasion a Bell 407 which has the capacity for 6 including guide is used.

In field the guests are advised they are enjoying the privilege of skiing in a Provincial Park; the parks purpose, special designation and that this privilege is a result of a historical Park Use Permit granted to Whistler Heli-Skiing.

3.2 Operational Guidelines

3.2.1 Ground Transportation

Clients are transported by bus or van to the municipal heliport. WHS operates 7-24-passenger buses and 5-15-passenger vans.

3.2.2 Helicopter Transportation

Helicopters depart from the Whistler Municipal Heliport at approximately 10:00am. Flight paths have been chosen to maximise safety and to mitigate noise impacts on residents in Whistler and other communities. Specific attention is given to avoid known concentrations or critical range of wildlife. The flight path into the Spearhead is by Wedge Creek north of Phalanx Glacier.

Flight paths normally follow the drainage pattern of the operating area and then use the maximum lift advantage from the wind to gain altitude. The Voluntary Flight Guideline for Garibaldi Provincial Park (1990) suggest 500ft clearance from ground level and horizontal features to minimize disturbance to visitors and wildlife and our pilots will adhere to these minimums, weather allowing. In addition**,** there are a number of restrictions and practices that are adhered to:

- Landings are permitted only within the heli-ski area tenure**.**
- Takeoffs and landings from the helicopter bases normally use noise reduction procedures (see below) when weather permits.
- No low level flights occur over Whistler Village and follow the Voluntary Flight Guidelines of 500ft in Garibaldi Provincial Park
- Flight paths in known areas of wildlife habitat (especially goat winter range) are designed to avoid the lower elevations and southern exposures.
- Flight paths are altered to avoid animals where they are observed.
- Flight paths are altered to avoid ski tourers when they are observed.

3.2.3. Aircraft Safety

- WHS follows approved safety procedures in their daily operations, such as regular flight check-ins as required in the HeliCat Canada Operational Guidelines. Our suppliers follow established protocols and procedures from the Canadian Aviation Regulations. These are a compilation of regulatory requirements designed to enhance safety and the competitiveness of the Canadian aviation industry.

3.2.4 Aircraft Noise

As noted above, noise reduction techniques are used on all regular takeoffs and landings whenever possible. Commonly used noise reduction techniques include avoiding excessive flaring of rotor blades during landings and pickups as well as avoiding direct over flight of visitors and wildlife.

3.2.5 Landings and Pickups

All of the landings and pickups are chosen for their suitability for safe helicopter operation. The landings and pickups are staked each season with a six-foot long, brown-painted stake, which has attached a two-foot long streamer of red nylon. This safety measure allows the pilot a reference point for landing, which is important in times of marginal weather or visibility. The stakes are periodically replaced during the season as the level of snowpack increases. Landing stakes are to be removed in the fall following each season.

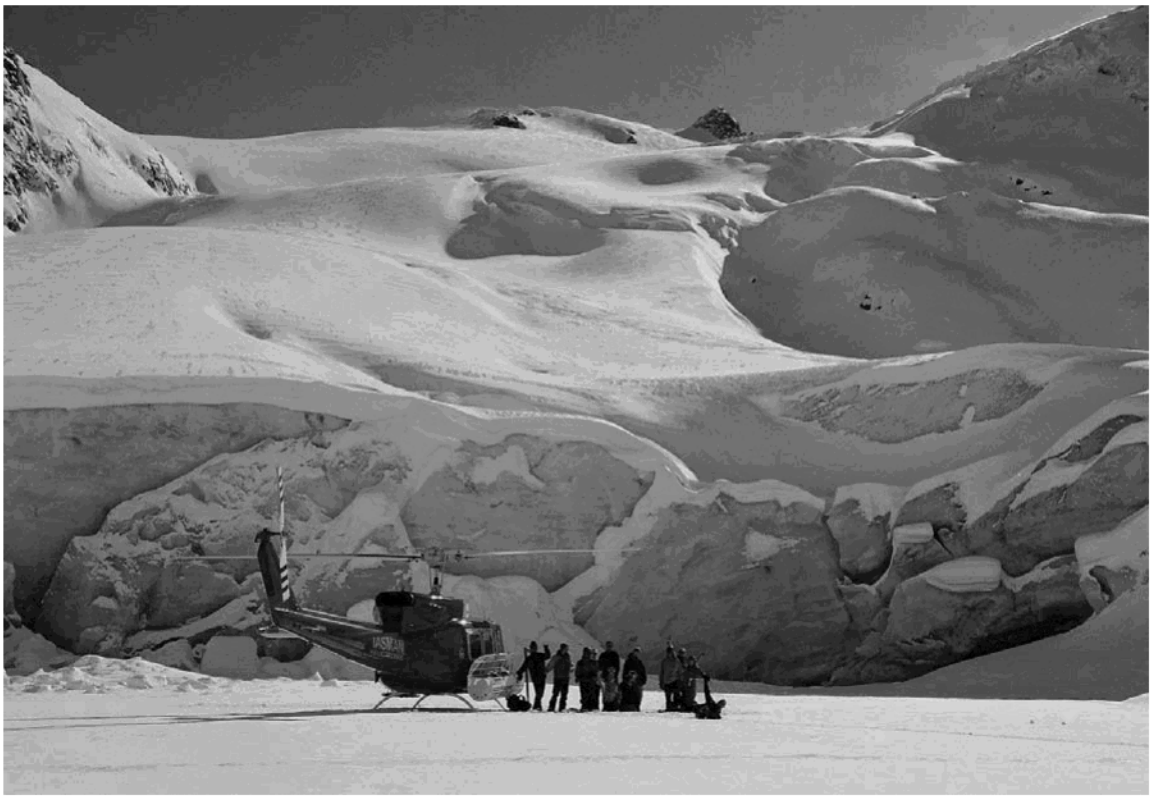
In general, preferred landings are at the peaks of a given ski run. This allows the pilot a safety factor for escape in 360 degrees and usually provides the most predictable wind conditions. There are a few landings that are at the tree line. These landings are natural open areas within the trees. No tree cutting or thinning is permitted without expressed written permission from BC Parks.

Pick-ups are normally located at the foot of glaciers, in a meadow, or in sub-alpine forest canopy openings.

The main landings and pick-ups are well established, having been used for more than 35 years. They are identified in the tenure map above and a GPS list has been added to the appendix.

4.0 Intensive Use Sites

WHS has no improvements within their PUP operating area. WHS retrieves wood landing marker stakes in the fall following each season after the snowpack melts. These flights also offer us the opportunity to photograph our glaciers without snow and observe crevasse patterns, glacial retreat and loss of mass. The flights happen once annually (usually September) and we spend about two hours in the park flying for just over one hour in the air.



Shudder Lake (pick up area for Shudder and Shatter runs. The toe of the glacier has significantly thinned since the photo was taken)

View from a col atop of the Phalanx Glacier looking towards Spearhead and Tremor Glaciers.

5.0 Levels of Use

The PUP requires that WHS provide information on the number of "client days", defined as each commercial recreation client who the tenured operator guides into the park in a particular day (up to 8 hours), and the time of year during which the activity takes place. The company's annual report, which is prepared at the conclusion of each operating season, will reflect the total number of skiers, or client days, taken in the PUP operating area.

Utilization of the operating area is dependent on several factors, including:

SNOW: Stability.
Snow pack depth.
Skiing quality.

WEATHER: Visibility for flying.
Precipitation.
Temperature.
Wind.
Anticipated changes during the day.

SEASON: Daylight hours.
Intensity of solar radiation.
General seasonal weather trends.

RUNS: Aspect of the run.
Pitch of the run.
Snow quality.

CLIENTS: Skier ability.
Skier expectations.
Physical condition.

After taking into consideration these factors along with the management requirements the lead guide makes his decision on which runs to ski on that particular day. The primary factor in daily run decisions is weather. In years with unusual weather conditions there tends to be much higher utilization of the poor weather areas (i.e. areas with good flight access, 4500 to 6500 foot elevation, and tree cover). Poor weather areas are limited to Spearman Ridge, Billygoat Ridge and to a lesser extent Phalanx.

It is the clear intention of WHS to utilise all of the terrain in accordance with the management plan, given the normal annual fluctuations in weather.

There are many factors that affect how intensively any given zone, drainage or run is used. Safety of operations is the primary overriding principle but there are many others. The obvious one is the number of clients WHS hosts each year.

Other, less obvious factors are skier ability (good skiers ski more than weaker skiers) as well as difficult skiing conditions that can severely limit amount of use. Poor flying conditions are a big factor that can constrict use to specific areas suitable for safe flying operations.

Snow stability is also of primary concern and can concentrate use to very specific runs for extended periods of time when the hazard rating (avalanche potential) is considerable or higher. Specific winter weather trends can also have a large impact, with some areas needing deep snowpack's to cover hazards such as stumps, alder, logs, rocks, crevasses, etc to even be skiable. In summary, all of these factors form part of a complex set of issues that interact differently, day-to-day and year-to-year, and govern where skiing occurs within the operating area license.

Historical usage with average number of client days can be found in the table below as well as future projections. Peak usage days are during periods of good weather with mid-February to mid-March being the busiest part of the winter. The Trorey and Tremor Glacier area see the most amount of skiers due to the lower hazard and gentler terrain with Phalanx Glacier following in order. Shudder, Shatter, Ripsaw and Naden Glaciers are more heavily crevassed and need the winter snowpack to fill in. About 25% of skier visits occur in the Park with the other 75% outside of the park. However around 1/3 of our guests travel in the bigger helicopters which move the most amount of people will end up in the Spearhead.

The following Levels of Use tables outlines the utilization for the operating area, based on past historic use and projected over the next 5 years, based on realistic growth rates for the company.

5.1 Levels of Use – Client Days/Year

Clients Day – Historic and Projected

Year	Historic	Maximum Projections
2007	1225	
2008	1345	
2009	1152	
2010	804	
2011	740	
2012	893	
2013	816	
2014	560	
2015	522	
2016	998	
2017		1000
2018		1000
2019		1000
2020		1000

6.0 Hazards and Safety Plan

WHS operates in a manner that is in accordance with its operating guidelines, as set out by HeliCat Canada (HCC). Copies of our waivers, Operations Manual and rescue plans, as well as HCC Operations Guidelines are available upon request.

The main hazards are from avalanches and crevasses as well as hazards typical of backcountry skiing such as falls, impacts with rocks and trees, whiteout navigation, cold & wind. There are also flight hazards in difficult weather.

We mitigate these hazards through expertise and standard operating procedures. All of our guides are certified by the Association of Canadian Mountain Guides or the Canadian Ski Guides Association. All have professional certifications issued by the Canadian Avalanche Association and our pilots are licensed and experienced. Furthermore we have years of experience with this terrain and this local knowledge is invaluable.

Our guides carry first response emergency equipment and our guests are all provided with avalanche rescue packs and transceivers.

Every day prior to starting operations we collectively conduct a complete and formal risk management assessment. Of primary importance is if and where avalanches are likely to occur. At the end of this exercise we open and close runs as a group based on hazard.

In the event of an incident WHS is backed up by an airborne rescue unit (the helicopter) containing full mountain rescue gear and pre-hospital first aid equipment. We are further backed up by other helicopters and guides working in other parts of our tenure.

Any injuries in the park are recorded and shared with BC Parks annually (see appendix). BC Parks will be notified of major incidents as soon as possible.

7.0 Impacts on Other Users

7.1 Public Use and Access

The area is accessed mainly from Blackcomb Mountain and is used by the public for ski touring. From our observations, distribution and volume is impacted by several factors:

- Distance from the ski area boundary - the closer to the boundary, more people, the further away, less people.
- Length of day – the shorter days mean fewer people, longer days mean more. Shorter day's public is closer to the ski area, longer days, more go further out.

- Weather – better weather results in more ski touring. Extended periods of good weather encourages further travel. In mixed or poor weather or shorter windows, we see fewer people.
- Weekends or mid-week – volume increases when public has time away for work.
- Fitness, experience and desire impacts volume and distance of travel.

WHS's operations do not restrict public access in any way, and the use of helicopters allow visitors to ski on these glaciers who would otherwise not have the means to do so.

The company recognizes the importance of this area of Garibaldi Park for ski touring, particularly the significance of the Spearhead Traverse which is located adjacent to the southwest boundary of the PUP, along the ridgeline of the Spearhead Range.

From our experience we have an understanding as to which glaciers or terrain are likely to see the most public and under what circumstances which help with avoidance.

7.1.1 Public Recreation Potential Conflicts

The current spatial and temporal distribution of heli-skiing activities relative to other recreation activities in the operating area serves to minimize potential land use conflicts. WHS has been coexisting with the public in this area for over 35 years. The use of helicopters also allows our visitors who would otherwise have no other means, an opportunity to experience skiing in the Park. There are, however, specific interactions between heli-skiing and ski touring.

Conflict can exist with a mixture of air-transport and lift accessed backcountry recreation due to the relative levels of noise, people, and activity associated with the different user groups. In remote areas, the presence of aircraft and heli-skiers in the vicinity could represent a disturbance to ski tourers looking for a "wilderness experience" and untracked snow in the backcountry. The greatest potential for conflict occurs mid to late winter when the days are longer; prolonged periods of good weather and during weekends. The Trorey Glacier is a key run with potential conflict during those select periods. However, like many of the other glaciers, public tends to not ski down the glacier as the heli skiers do, rather they traverse across the glacier as part of their travels which helps with avoidance. Mitigation of conflicts are listed in the paragraphs below.

7.1.2 Public Recreation Management Actions

WHS recognizes that although they have an exclusive use of the tenure areas for mechanized skiing operations, these operations are non-exclusive of public recreation and other land uses.

WHS makes efforts to avoid skiing immediately adjacent to the ski touring parties by selecting terrain further away and especially takes care to alter their flight

paths to avoid over-flying the groups. This is not always possible due to weather, skier ability and hazards.

Management actions have been taken to prevent or mitigate potential land use conflicts in the operating area:

- When public is encountered at a landing, the helicopter pilot will attempt to avoid close contact and maintain a buffer distance of 500ft (*pilots operate in feet not meters*).
- Anticipate what time of day other users typically approach certain glaciers and plan around it.
- Move away from glaciers that have other users on them as soon as is reasonably possible.
- If interaction occurs inadvertently, we find a guide skiing over and speaking with the other users is often very helpful. We apologize if there is an intrusion and inform them that we plan to move away.
- If public are identified by a heli-ski guide in the vicinity of the proposed ski run, while approaching a drop off point, the helicopter pilot will be instructed to relocate to another run to avoid impacts to the ski tourers (subject to avalanche stability, weather consideration and skier ability). Any other groups of heli-skiers planning to use the same drop off point will be advised to relocate as well.
- WHS will avoid the Spearhead on weekends and holidays during specific months and on all weekends when there is good weather and therefore high levels of ski touring use anticipated.
- WHS will maintain a web page link that will provide a form for public recreation users to fill in that will allow the general public an opportunity to make direct comments to the company if they wish to express a concern or complaint about impacts or possible infractions by the operator, arising from heli skiing activity in the Spearhead area.
- Develop a cooperative relationship with public recreation user groups and other PUP holders and organizations such as Spearhead Hut's Committee/ACC and Thompson Rivers University. Large groups can also contact us directly or through our form on our website and inform us of their plans to minimize conflict.
- Erect signage with input from BC Parks at the boundary of Blackcomb Glacier an entry point to the park. The signage will advise all users that heli-skiing occurs and our contacts so that public recreation users can contact WHS and inform the company of their proposed routes and locations for the day. WHS will make every effort to co-operate with the public recreation users and avoid their locations
- Help other users who may find themselves in trouble.

- Supply the general public with avalanche information through appropriate channels.

- Record ski touring interaction and report to BC Parks annually (see appendix) as well as any complaints received during the course of the winter.

7.1.2.2 Huts

The Spearhead Huts Committee/Alpine Club of Canada has received a PUP for three huts accessed through Whistler Blackcomb's CRA.

- Russet Lake area which is outside the WHS PUP and presents no conflict due to its distance from our terrain is intended to be the first built.

- Macbeth Hut proposal is outside our PUP area and presents some possibilities for conflict/avoidance for those traversing from the Blackcomb Ski area.

- Pattison Hut proposal is within our PUP area. Should this hut eventually be developed, mutually conceived mitigation strategies will need to be developed that could include: identifying standard landings and protocol; complete avoidance on specific days; expectations for shared usage with other skiers; emergency response from WHS for public users; assistance with transport needs for hut infrastructure.

Prior to development of a hut near Pattison Mountain and possibly a hut near the Macbeth Glacier, this part of the management plan will require a revision informed by dialogue and consultations with the Alpine Club of Canada and BC Parks.

7.2 Other Commercial or Public Recreation Interests

Other users include Extremely Canadian (owned by WB) Whistler Alpine Guides, Thompson River University, Coast Mountain Guides and private guides from the Association of Canadian Mountain Guides.

8.0 Fish, Wildlife and Environmental Values

8.1 Wildlife

Valley bottoms in the operating area contain primarily regenerating and mature coniferous forest which provides habitat for a variety of wildlife species.

At higher elevations on the valley walls, forest cover dominated by mountain hemlock and other vegetation characteristic of the Coastal Mountain-Heather Alpine Zone supports fewer wildlife species than most other Biogeoclimatic zones (Meidinger and Pojar, 1991). There are likely no reptiles and few amphibians in this zone, while large mammal use apparently is concentrated in specific locations such as avalanche tracks.

With the harshest climate of all Biogeoclimatic zones identified on the landscape, the alpine tundra (AT) zone is generally of low value as wildlife habitat (Meidinger and Pojar, 1991). The sparse alpine vegetation provides limited animal forage, and the local climate produces a deep to very deep snowpack over what forage exists (following Nyberg and Janz 1990).

Wildlife that may reasonably be expected to occur during late winter and spring months in the higher elevation heli-skiing operating area includes the following:

Mountain goat (*Oreamnos americanus*)
Wolverines (*Gulo luscus*)
Marmots (*Marmota caligata*)
Blue grouse (*Dendragapus obscurus*)

A partial list of other wildlife potentially in the operating area would include the following mammals:

Black bear (*Urus americanus*)
Grizzly bears (*Ursus horribilus*)
Lynx (*Lynx canadensis*)
Cougar (*Felis concolor*)
Weasel (*Mustella ermina*)
Ptarmigans (*Lagopus)*
Wolves (*Canis lupus)*

Of the wildlife listed on the "Rare vertebrate animal tracking list (CDC 2016), the grizzly bear, wolverine and mountain goat are the only "blue-listed" (classified as sensitive or vulnerable) mammals reported in the tenure area. The grizzly bear population within the Garibaldi-Pitt population unit is classified as endangered and estimated at 2 bears in 2012 (BCMFLNRO 2012) so encountering a grizzly bear or bear den seems unlikely. Grizzlies are likely to be in hibernation during

winter months, but wolverines and mountain goats have been noted throughout the alpine in the winter.

Both deer (*Odocoileus hemionus columbianus*) and moose (*Alces alces*) are known to range between valley bottoms and the sub-alpine or even alpine, although during winter and spring the deep snowpack and delayed growing season at higher elevations may make low elevation forest cover more attractive to these species.

Mountain goats are the most conspicuous wildlife known to utilize the operating area during winter months. Winter range is considered to be the most critical ungulate habitat type since resources (e.g. forage, thermal cover) available to the animals are so much more limited in the winter than in other seasons. Their preferred winter habitat provides rocky escape terrain, coniferous forest cover nearby, and opportunities for foraging on mosses, lichens, and shrubby vegetation. South-facing slopes are favorable since such areas tend to receive and absorb more solar radiation, which contributes to a shallower snowpack and therefore provides better foraging opportunities.

"Over the years, the populations of Mountain Goats in the Spearhead Area of Garibaldi Park have been monitored using aerial surveys, mainly in winter, to provide relative estimates of population abundance and health. Past studies revealed the population of goats in the park is in decline, with 50 to 70 animals estimated in the park in 1990. Small populations like those in Garibaldi Park are more vulnerable and at greatest risk of extirpation (Ministry of Environment, 2010).

BC Parks undertook goat monitoring flights in March 2012 and March 2013. The results indicate that Mountain Goat populations within the study area appear to be relatively stable and healthy although the status of the goat population throughout the park has not been determined. This is in contrast to declining trends in Mountain Goat populations in the Sea to Sky region outside the park, where they are more vulnerable to human access and development." (Garibaldi Park Management Plan Amendment February 2014).

WHS will commit to financing 1-2 annual flights over the term of the permit to support long-term monitoring of goat populations with BC Parks/FLNR providing in-kind support (biologist for flight and reporting). The costs associated with these flights will be limited to a fixed amount as agreed upon with BC Parks.

Figure 4 – Goat habitat and current PUP boundaries

Wolverines are known to occur in the Spearhead. Wolverines use dens to birth and nurse and shelter cubs which are born in late February to mid-April and remain in the den for 8-10 weeks. Dens may be constructed under snow in the alpine and subalpine, and are often built where rocks, logs or fallen trees add structure to support the den (BCMWLAP 2004; Wolverine Foundation 2016).

Spotted owls (Strix occidentalis) occur in mature forest up to elevations of approximately 1500 m (5000 feet), which represents some potential overlap with the lowest elevation heli-skiing although an encounter is unlikely. Spotted owls are potentially most sensitive to disturbance during nesting and breeding (which can occur between March and July). The 2004 Recovery Strategy for the Northern Spotted Owl [Chutter et al. 2004] suggests that spotted owl are potentially disturbed by noisy activities such as low-flying helicopters.

8.1.1 Wildlife Impacts

Potential impacts on wildlife from heli-skiing activities likely would be limited to those species that utilize sub-alpine and alpine habitats during winter.

Literature cited in the COSEWIC assessment of wolverines (COSEWIC 2003) suggests that recreational activities during the late winter denning period may result in disturbance to females and their litters leading to relocation or abandonment, and human recreation that includes snow travel, including backcountry skiing, appears to disturb denning wolverines.

Helicopter and fixed-wing aircraft disturbance of mountain goats show high sensitivity to helicopter disturbance (Côté 1996; Gordon and Wilson 2004; Goldstein et al. 2005). Behavioural response of mountain goats to helicopter disturbance ranges from weak (e.g., no observed disruption, increased vigilance), to strong (e.g., severe flight response to escape terrain either forest cover or cliff

terrain and temporary abandonment of range), and is inversely related to the distance of the helicopter from the group….reaction to helicopters varies among areas, and may be related to the degree of prior exposure to helicopters. (2010 Management plan for the Mountain Goat in British Columbia).

The 2004 Recovery Strategy for the Northern Spotted Owl [Chutter et al. 2004] suggests that spotted owl are potentially disturbed by noisy activities such as low-flying helicopters. An encounter with Spotted Owl in our permit area is unlikely.

8.1.2 Wildlife Management Actions

WHS will follow the Wildlife Guidelines for Backcountry Tourism/Commercial Recreation in British Columbia (BCMoE 2006). HeliCat Canada, our industry trade association also has Best Practices for Sustainability (BCHSSOA 2003) which include recommendations and practices for avoiding and mitigating impacts to wildlife which we will commit to.

WHS will choose standardized flight paths that avoid known wildlife habitat and adjust flight paths to avoid wildlife encountered during flights to reduce impacts to wildlife. The preferred and standardized flight path into the Spearhead permit area is by Wedge Creek north of Phalanx Glacier. Alternate flight paths in poor weather are via Blackcomb Mountain. WHS will avoid flying directly over the four mapped goat winter ranges areas shown in Figure 4, particularly at low elevations, unless necessary for safety reasons.

WHS will also:

- Take immediate action to increase separation distances when animals react to aircraft.
- Use consistent flight paths, preferably in the center of valleys, or the valley side opposite key wildlife habitat (i.e. goat winter range). If key wildlife habitats are in the center, fly on one side of the valley rather than the center.
- Identify and use regular and predictable patterns and distribution of flights.
- Stay at distances sufficient to prevent changes to the behaviour of animals. More than 500 m line-of-sight is the default for most wildlife (but as described above, the distance will be greater for mountain goats).
- Use wildlife observations and monitoring to adjust flight paths to avoid areas where animals are regularly observed. Use information from previous day's observations to plan the subsequent day's travel routes

Mountain Goats: The Management Plan for the Mountain Goat in BC (MoE 2010) recommends a minimum 2000 m horizontal separation and 400 m vertical separation of helicopter flights from mountain goat habitat which WHS will follow. Where flights need to occur closer to mountain goat habitat as in the Fitzsimmons drainage, WHS will use topographic barriers to separate helicopters

from mountain goat and minimize the number of flights and time spent within disturbance space. WHS will limit its season to April 30th to not interfere with kidding periods.

Wolverine: Repeated encounters with wolverine in an area may indicate the presence of a den and such an area will be avoided for skiing, and flying and landing helicopters. In a situation where a den is suspected, BC Parks will be notified as soon as possible, and the area of observation avoided pending consultation with a wolverine biologist.

Spotted Owl: If a spotted owl is encountered, the encounter location will be assumed to potentially be a nesting area and avoided for helicopter flights. BC Parks will be notified as soon as possible if a spotted owl is encountered, and a spotted owl biologist can be brought in to confirm that nesting is occurring and whether further avoidance is necessary.

To reduce wildlife impacts associated when we are on the ground WHS will follow the following guidelines:

- Pack out all garbage.
- Use existing facilities for human waste, pack it out, or bury it in deep snow at least 100 m from water sources.
- Remain still or retreat when animals are encountered and react to your presence.
- Stay at distances sufficient to prevent changes to the behaviour of animals (at least 100 m in open areas is the default for large mammals).

Wildlife reporting:

WHS will record in our data base all wildlife sighting including date, helicopter call sign, guide submitting, run name, zone name, interaction type, number sighted and further details in a comment box. This information will be part of our annual report to BC Parks.

Wildlife observation data will be used to adjust flight paths, identify areas and habitats where wildlife are commonly or occasionally sighted, and plan travel routes in the air and on the ground that minimize overlaps with wildlife. This data can be used on a daily basis to plan trips, and over the longer term to identify areas frequented by wildlife that may need to be avoided or where activities may need special management.

Staff training: All guides and pilots attend staff training prior to the start of each season. WHS will cover relevant guidelines including:

- Flight routes and minimum distances from wildlife habitat
- Mapped goat habitat
- Actions when wildlife is observed
- Recording and communicating wildlife observations.
- Environmental responsibilities on the ground.

8.1.3 Trees:

Whitebark pine is a species listed as Endangered on Schedule 1 of the Federal Species at Risk Act and has been observed in the Spearhead area. The Canadian Wildlife Service has mapped candidate critical habitat which overlaps the entire permit area. No whitebark pine trees will be damaged or removed associated with heli-skiing activities.

8.1.4 Fuel:

Fuel spills: WHS and their carriers will not be refueling in BC Parks and will therefore not be exposing the environment to the potential for fuel spills.

9.0 Cultural and Heritage Values

The Park Use Permit area is within the traditional territory of the Squamish Nation and the Lil'Wat Nation.

WHS is committed to working collaboratively with First Nations through the implementation of our permits.

We recognize that Garibaldi Park is subject to constitutionally protected (section 35 of the Constitution Act, 1982) aboriginal and treaty rights.

WHS will endeavor to recognize and protect First Nations' cultural values and traditional uses.

WHS will be sensitive to and protect culturally sensitive and recognized archeological sites such as pictographs (between Wedge Creek and Billy Goat Creek) and any aboriginal trails as designated.

WHS will fulfill the requirements associated with archeological and environmental assessments prior to any Crown land development in other tenures outside of Garibaldi Park.

WHS will offer employment, training and contracting opportunities within all areas of its business.

APPENDIX

Report: Wildlife Interactions

Trip Date	Helicopter	Lead Guide	Submitted By	Run Name	Zone Name	Interaction Type	Number Sighted	Location	Comments
12/15/2014	407 FCH	Rob Rainer	Rob	Tremor Glacier	Spearhead Zone			50,041530 N 122.490376	Wolverine running across glacier , observed from air

Report: Human Interactions

Trip Date	Helicopter	Lead Guid	Submitted By	Run Name	Zone Name	Interaction Type	Number Sighted	Location	Comments
12/22/2014	212 ZHZ	Andrew Wilkins	Andrew Wilkins	Vista Bowl	Spearhead Zone	Ski Tourer	2	Vista Bowl	Ski chute, skiers right
12/24/2014	407 FCH	Rob Rainer	neil brown	Spearhucker	Spearhead Zone	Ski Tourer	2	Spearhucker	made contact, very friendly Vancouverites
12/25/2014	205 JTH	Dale Marcoux	Dale M	Decker Shoulder	Spearhead Zone	Ski Tourer	2	Decker Shoulder	Two ski-tourers were preparing to ski the Upper Shoulder couloir as second group was lifting into drop-off on Shoulder for lunch. No direct interactions.
1/1/2015	205 JTH	Vlad Lamoureux	vlad	Trorey Glacier	Spearhead Zone	Ski Tourer	6	Trorey Glacier	Attempted to use Trorey Main after lunch, but saw 6 ski tourers on their way up to Pattison from the col. Avoided Trorey completely and worked Tremor Glacier, staying more than 1 km from the ski touring party.
1/14/2015	205 JTH	Vlad Lamoureux	vlad	Spearhucker	Spearhead Zone	Ski Tourer	2	Spearhucker	On final approach to Phalanx right landing, 2 ski tourers were dropping into

									the south side of Phalanx Ridge. No conflict.
1/16/2015	205 JTH	Vlad Lamoureux	vlad	Vista Bowl	Spearhead Zone	Ski Tourer	2	Vista Bowl	Two ski tourers 2 km away on Spearhead west ridge. No conflicts or issues.
1/20/2015	212 ZHZ	John Furneaux	John F	Phalanx	Spearhead Zone	Ski Tourer	6	Phalanx	6 skiers going by landing on the way to the poop chutes, did not land.
1/31/2015	205 JTH	Rich Prohaska	Rich Prohaska	Decker Glacier	Spearhead Zone	Ski Tourer	2	Decker Glacier	only saw two tourers. traversing toward blackcomb. we were at trorey pu. they were dots on mid glacier.
2/11/2015	212 ZHZ	John Furneaux	John F	Decker Glacier	Spearhead Zone	Ski Tourer	2	Decker Glacier	No conflicts, seen from distance
2/16/2015	205 JTH	Rob Rainer	Rob	Trorey Glacier	Spearhead Zone	Ski Tourer	6	Trorey Glacier	Ski tourer coming up Trorey Gl , and some on Tremor Gl , adjusted program to avoid conflict
3/16/2015	205 JTH	John Furneaux	john f	Trorey Glacier	Spearhead Zone	Ski Tourer	4	Trorey Glacier	Group on Patterson peak, skiing N face while we skied Trorey. No interactions
4/2/2015	205 JTH	Rich Prohaska	Rich Prohaska	Trorey Glacier	Spearhead Zone	Ski Tourer	3	Trorey Glacier	Skiers heading east towards Pattison. Aborted approach.
4/4/2015	407 FCC	John Furneaux	john	Trorey Glacier	Spearhead Zone	Ski Tourer	10	Trorey Glacier	avoided run all day
4/4/2015	407 FCC	John Furneaux	john	Tremor Glacier	Spearhead Zone	Ski Tourer	15	Tremor Glacier	Doing spearhead, we always maintained 500 m or more avoidance, not conflict with skiiers or heli

4/4/2015	407 FCC	John Furneaux	john	Spearman Glacier	Spearhead Zone	Ski Tourer	9	Spearman Glacier	Avoided run due to group on ski line
4/7/2015	407 FCH	Rich Prohaska	Rich Prohaska	Trorey Glacier	Spearhead Zone	Ski Tourer	2	Trorey Glacier	saw two fast moving skinners heading across run. They came around corner while we skied. Distance 400m.
4/7/2015	407 FCH	Rich Prohaska	Rich Prohaska	Tremor Glacier	Spearhead Zone	Ski Tourer	0	Tremor Glacier	Saw tent dug in on upper tremor between our standard drop and the tremor col. 300m? from our drop. Didnt see people.

Report: Incidents

Trip Date	Helicopter	Lead Guide	Submitted By	Run Name	Zone Name	Interaction Type	Number Sighted	Location	Comments
1/8/2015	407 FCH	John Furneaux	John F	Naden Glacier	Spearhead Zone			Naden Glacier	Guest 403 fell and had minor cuts on her face, cleaned them up in field and she continued to ski
3/16/2015	205 JTH	John Furneaux	john f	Phalanx	Spearhead Zone			Phalanx	claire williams crashed on 4th run and hit head, assessed and brought to clinic. She was released shortly after. Paiges group.
4/2/2015	205 JTH	Rich Prohaska	Rich Prohaska	Tremor Glacier	Spearhead Zone			Tremor Glacier	Two Lower leg injuries. See above and Accident reports filed to office

GPS Run and Landing Locations:

ID	LABEL (Map)	NAME (Database)	ZONE	Latitude WGS84 Centroid	Longitude WGS84 Centroid
0504		Phalanx Left	Spearhead	50 6' 37.094" N	122 51' 27.393" W
0505	Phalanx	Phalanx Right	Spearhead	50 6' 30.123" N	122 51' 15.170" W
0505		Phalanx	Spearhead	50 6' 0.113" N	122 51' 27.898" W
0506	Spearhucker	Spearhucker Left	Spearhead	50 6' 16.914" N	122 50' 58.584" W
0508		Spearman Glacier	Spearhead	50 5' 29.088" N	122 50' 35.109" W
0508	Spearman	Spearman	Spearhead	50 5' 44.120" N	122 50' 23.940" W
0509	Secret Bowl	Secret Bowl	Spearhead	50 6' 18.463" N	122 49' 51.894" W
0510	Flying Saucer	Flying Saucer	Spearhead	50 5' 50.083" N	122 49' 26.854" W
0511		Vista Bowl	Spearhead	50 5' 7.649" N	122 49' 59.788" W
0511	Vista Bowl	Vista Bowl	Spearhead	50 5' 9.497" N	122 50' 23.658" W
0512	Decker	Decker Glacier	Spearhead	50 4' 37.422" N	122 50' 22.366" W
0513	Trorey	Trorey Glacier	Spearhead	50 3' 50.490" N	122 50' 8.271" W
0513		Trorey	Spearhead	50 4' 13.514" N	122 49' 47.922" W
0514	Trorey Side	Trorey Side	Spearhead	50 4' 5.394" N	122 49' 38.093" W
0515	Tremor	Tremor Glacier	Spearhead	50 4' 2.547" N	122 48' 40.394" W
0515		Tremor	Spearhead	50 3' 44.200" N	122 48' 46.558" W
0516		Tremor Side Left	Spearhead	50 4' 19.039" N	122 48' 28.026" W
0517	Tremor Side	Tremor Side Right	Spearhead	50 4' 28.555" N	122 48' 25.532" W
0518		Twister	Spearhead	50 4' 58.396" N	122 48' 48.962" W
0519		Nanny Goat Right	Spearhead	50 5' 29.028" N	122 48' 38.286" W
0519	Nanny Goat	Nanny Goat	Spearhead	50 5' 24.157" N	122 48' 39.416" W
0521		Billy Goat Left	Spearhead	50 5' 58.851" N	122 48' 41.775" W
0523	Billy Goat	Billy Goat Right	Spearhead	50 5' 59.435" N	122 48' 21.367" W
0523		Billy Goat Right	Spearhead	50 5' 57.382" N	122 47' 59.347" W
0523		Billy Goat Right	Spearhead	50 5' 45.130" N	122 48' 4.972" W
0525	Billy Goat Bowl	Billy Goat Bowl	Spearhead	50 5' 38.365" N	122 47' 39.087" W
0526		Shudder Side	Spearhead	50 4' 42.590" N	122 47' 35.115" W
0526	Shudder Side	Shudder Side	Spearhead	50 4' 51.485" N	122 47' 36.920" W
0527		Shudder Glacier	Spearhead	50 3' 59.876" N	122 47' 47.640" W
0528	Shudder	Shudder Glacier	Spearhead	50 4' 7.886" N	122 47' 11.410" W
0529	Shatter	Upper Shatter Glacier	Spearhead	50 3' 44.334" N	122 46' 16.857" W
0529		Upper Shatter Glacier	Spearhead	50 3' 38.235" N	122 46' 57.459" W
0530		Shatter to Shudder	Spearhead	50 4' 11.653" N	122 47' 0.176" W
0532		Lower Shatter Glacier	Spearhead	50 4' 42.038" N	122 46' 16.780" W
0533		Shatter Trees	Spearhead	50 4' 53.412" N	122 45' 48.046" W
0534	Quiver	Quiver	Spearhead	50 4' 1.698" N	122 45' 13.357" W
0535	Ripsaw	Upper Ripsaw Glacier	Spearhead	50 2' 36.631" N	122 46' 54.378" W
0536		Lower Ripsaw Glacier	Spearhead	50 2' 48.195" N	122 45' 27.041" W
0537		Ripsaw Side West	Spearhead	50 2' 30.015" N	122 45' 45.006" W
0538	Ripsaw Side	Ripsaw Side East	Spearhead	50 2' 23.707" N	122 45' 20.567" W
0540		Naden Glacier	Spearhead	50 1' 11.536" N	122 45' 50.308" W
0540	Naden	Naden Glacier	Spearhead	50 1' 56.779" N	122 46' 50.207" W
0542		Iago Lower	Spearhead	50 1' 13.800" N	122 46' 23.373" W
0542	Iago	Iago Glacier	Spearhead	50 1' 25.310" N	122 47' 36.534" W
0578		Spearhucker Right	Spearhead	50 6' 8.698" N	122 50' 37.235" W
0579		Nanny Goat Left	Spearhead	50 5' 13.477" N	122 48' 36.911" W

(note: Decker top, Quiver bottom and Iago top/bottom deleted from list)