Appendix B:

Mount Carleton and Christmas Mountains Snowmobile Trails Development Operations and Business Plan

Trails Work Consulting

Annexe B :

Opérations et plan d'affaires du mont Carleton et des monts Christmas

Trails Work Consulting

Mount Carleton & Christmas Mountains Snowmobile Trails Development

OPERATIONS AND BUSINESS PLAN

Prepared for

The New Brunswick Federation of Snowmobile Clubs, Inc.
and the New Brunswick Department of Tourism, Heritage and Culture

By

Trails Work Consulting

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EXECUTIVE SUMMARY

The New Brunswick Department of Tourism, Heritage and Culture formed a partnership with the cities of Edmundston, Campbellton, Bathurst, and Miramichi to market Northern New Brunswick as a world-class snowmobile trail experience under the theme of 'Northern Odyssey.' While this Northern Odyssey region currently hosts about 80% of all same-day snowmobile trips and over 90% of all overnight snowmobiling trips in the province, there is potential to accommodate more snowmobile tourism since snowfall is abundant for long periods and winter lodging occupancy rates in the region currently average about 30%.

While Mount Carleton Provincial Park is located almost exactly in the center of Northern Odyssey, snowmobile trails currently only touch park fringes with no snowmobile trail traveling directly through its center. Consequently the Northern Odyssey snowmobile trails system has a blank spot in the middle without a central route directly connecting communities around its perimeter. The Mount Carleton area and Christmas Mountains to its south have strong potential to enhance snowmobile tourism since they are extraordinarily scenic, regularly receive good snowfall from November through April, and host a network of DNR roads that could potentially be used to create additional snowmobile opportunities during winter.

The key to growing snowmobile tourism is providing more and improved trail grooming. The New Brunswick Federation of Snowmobile Clubs provides the province's snowmobile trails and has five clubs based at the outer edges of the region that currently maintain, sign and groom 1,179 kilometers of snowmobile trails surrounding Mount Carleton. Since trail grooming is a very slow process – averaging only 7 to 10 kilometers per hour – club volunteers often have to travel 10 to 20 hours one-way just to reach the Mount Carleton area from their home grooming base. Consequently snowmobile trails in the center of the region may not get groomed as often as those closer to a groomer's home community, sometimes leading to lesser quality trails in the region's center.

This plan proposes to improve the quality of snowmobile trails in the center of Northern Odyssey by establishing a new snowmobile trail grooming base at Mount Carleton Provincial Park. It would also add up to 343 kilometers of new snowmobile trails in the Mount Carleton and Christmas Mountains area to increase opportunities. The new grooming base would enable central trails to be groomed earlier and later in the season when lower snowfall around the perimeter can prevent groomer access to the region's center. This will help grow snowmobile tourism by providing four to six weeks of additional snowmobiling opportunity within the region. It would also make the area more attractive to snowmobilers by improving trail quality with more consistent grooming around Mount Carleton while adding new loop opportunities that will improve trail grooming efficiencies and effectiveness in the area.

Total maximum one-time project development costs are estimated to be in the range of about $954,000 to $1.057 million, depending upon if all proposed new trail routes on DNR roads are approved. This would include three new trail bridges and one bridge rebuild within Mount Carleton Park, trail clearing and improvement within the park, trail signing in and around Mount Carleton, four new trail shelters along new trail loops outside the park, and two new trail grooming units based at Mount Carleton. If necessary, development costs could be phased at approximately $500,000 per year over two years. Total annual operating costs are estimated to be about $249,000 which includes up to $154,000 for a 'two grooming tractor' operation with four operators (but would be less if all new trails on DNR roads are not approved) and an annualized grooming equipment replacement cost of $95,000 for the two groomers if they were each on a rotating three-year replacement schedule.

It is estimated that adding five to six additional weeks to the Northern Odyssey's snowmobiling season could result in 300 to 750 additional snowmobile trips per season. This would create $800,000 to $2 million+ per year in additional snowmobile visitor spending, generate $90,000 to $227,000+ per year in additional provincial tax revenue, and result in the creation of 15 to 39+ new full-time jobs. This growth would likely start near the low end of projections but quickly trend upward, perhaps eventually exceeding 1,000 new trips, once the new grooming base and an expanded trail network becomes established.

INTRODUCTION

Snowmobiling is a core winter activity in New Brunswick and plays a major role in winter tourism marketing by the New Brunswick Department of Tourism, Heritage and Culture (Department). The New Brunswick Federation of Snowmobile Clubs (Federation), a non-profit organization, has been the Province's designated snowmobile trail manager since the adoption of mandatory snowmobile trail permits in 2000. Together these two entities make considerable efforts to provide high quality snowmobile trails across New Brunswick using immense volunteer efforts from Federation clubs and revenues generated from the sale of snowmobile vehicle registrations and trail permits.

Snowmobile tourism is extremely important in New Brunswick and generates significant revenue for tourism operators, particularly in the northern part of the province. The 2008-2009 Snowmobile Tourism Economic Impact Study indicates that 87% of all reported snowmobile destinations are in northern New Brunswick and that, province-wide, snowmobilers spend an estimated $12.3 million during their trips. Annual expenditures by snowmobilers include $5.4 million on fuel and vehicle operation expenses; $4 million on food and beverages in New Brunswick restaurants and stores, and $1.2 million on New Brunswick accommodations. In total these expenditures generate $22.5 million annually in total economic activity within the province and provide about $1.4 million in provincial tax revenues.

The Department must be strategic, innovative, and creative in its efforts to remain competitive in promoting New Brunswick snowmobile tourism. To help accomplish this goal it formed a marketing partnership with the cities of Edmundston, Campbellton, Bathurst, and Miramichi, under the theme of 'Northern Odyssey,' to promote northern New Brunswick as a world-class snowmobile trail experience. This partnership has proven to be a valuable tool in helping maintain a viable snowmobile tourism sector.

Photo 1: Snowmobiling in the Mount Carleton area

Key Considerations for this Development Plan

This plan proposes to grow snowmobile tourism by improving and expanding snowmobile trail opportunities in the center of the Northern Odyssey region, specifically in and around Mount Carleton Provincial Park (Park) and in the Christmas Mountains area. The key element to attracting more snowmobile visitors to this region revolves around providing additional snowmobile trail grooming. The key challenge to accomplishing this is that current trail grooming efforts are at capacity in the region due to dependency on over-burdened Federation volunteers and their grooming equipment being stationed a long distance from the Mount Carleton area.

Consequently this plan keys on adding a new trail grooming hub, centralized at the Park, to help improve snowmobile trail quality and lengthen the snowmobiling season in the center of Northern Odyssey. New trail loops will also be added to expand snowmobiling opportunities in the area, which will also help improve trail grooming efficiency in this area. This increased emphasis on snowmobile trail grooming is critically important to growing winter tourism, which will ultimately also create new area employment opportunities and increase the visibility of Mount Carleton Provincial Park.

This development plan specifically considers the following key factors:

1. The potential for expanding northern New Brunswick's snowmobiling tourism season – which could possibly become upwards of five months long and be one of North America's longest available snowmobile trail riding opportunities east of the Canadian or U.S. Rocky Mountains.

2. The feasibility and potential costs related to creating a new trail grooming hub at Mount Carleton Provincial Park, since it is centralized within the Northern Odyssey region, to provide early and late season trail grooming to help extend New Brunswick's snowmobile tourism season.

3. The feasibility and potential costs of expanding the total kilometers of snowmobile trails available within Northern Odyssey, by developing multiple trail loops around Mount Carleton and in the Christmas Mountains, that could potentially create increased snowmobile visits, more overnight stays, and greater tourism expenditures.

4. The potential economic results from focusing the Province and Federation's combined resources to further position New Brunswick as a premier snowmobile tourism destination – with equivalent or better trails, grooming, signage, scenery, services, amenities, and opportunities for multiple day loops as compared to Quebec – the primary regional snowmobile tourism competitor of New Brunswick.

Photo 2: Trail #23 between Riley Brook and Mount Carleton

Black Hills of South Dakota: Model for the 'Mount Carleton Grooming Base' Concept

The concept for establishing a centralized grooming base at Mount Carleton Provincial Park originated with a 2007 visit by the Federation's General Manager to the Black Hills of South Dakota. He saw first-hand during this trip how the Black Hills has become a premier snowmobile tourism destination in the Midwest United States, and recognized potential for similar snowmobile tourism development in northern New Brunswick. Some of the parallels between the Black Hills and the Northern Odyssey region include:

- The Black Hills snowmobile trail system is managed by the South Dakota Department of Game, Fish and Parks (State Parks). Thus he saw potential between a state park-operated grooming program and a possible provincial park-operated grooming program at Mount Carleton to help fill a grooming void in the center of Northern Odyssey.
- Both areas have similar scenic, mountainous terrain where it would generally be unexpected.

- South Dakota state park's Hardy Work Center is centrally located in the busiest portion of the Black Hills trail system, similar to the position of Mount Carleton Provincial Park being centrally located within the Northern Odyssey region. This central grooming hub allows South Dakota to operate a very aggressive trail grooming program to help attract and retain its snowmobile visitors.
- The Black Hills snowmobile trail system originated as a segmented, club-groomed trail system of only 70 miles (112 kilometers) in the early to mid-1970's, but quickly grew to a 130-mile (210 kilometers) interconnected trail system once state parks got involved with trail grooming around 1980, and hosts a 350- mile (563 kilometers) network of snowmobile trails today. Similarly snowmobile trails in the Northern Odyssey region have their roots with local club trails that have grown into an interconnected trail system; however any growth in grooming efforts will likely require involvement from a new partner – such as from the provincial park similar to what occurred in the Black Hills – since existing club volunteer efforts have reached their likely maximum capacity.

Photo 3: Black Hills snowmobile trail

- In addition to the snowmobile trail system, the Black Hills offers abundant snowmobiling opportunities on ungroomed Forest Service roads throughout the area, similar to off-trail snowmobiling opportunities on the network of snow covered DNR roads in the Mount Carleton area.
- The South Dakota Department of Tourism and surrounding communities partner to aggressively market Black Hills snowmobiling opportunities, similar to the Northern Odyssey marketing partnership in New Brunswick.
- The Black Hills has become a major snowmobile tourism destination in the Midwest, similar to how the Northern Odyssey region of New Brunswick has become a premier snowmobile tourism destination in the Maritimes. Approximately 95% of South Dakota's $15 million annual snowmobile trip expenditures are related to the Black Hills snowmobile trail system (http://gfp.sd.gov/to-do/snowmobile/docs/snowmobile-economic-impact-study.pdf) while the Northern Odyssey region currently accounts for about 87% of all New Brunswick snowmobiling activity.

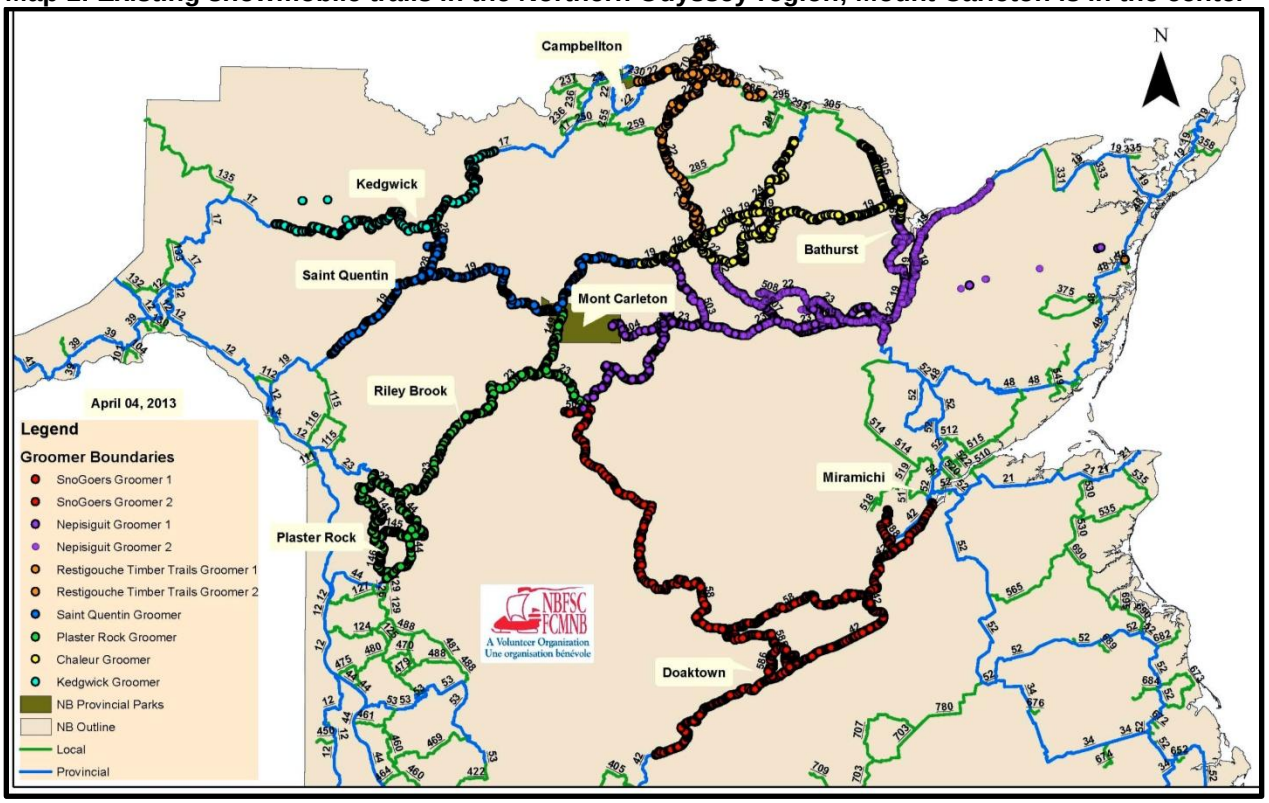
The Black Hills model has proven to be very successful in attracting snowmobile tourism, helping keep motels, restaurants, bars and other businesses open in small communities during what historically used to be a slow winter season. Over the years private entrepreneurs have also established several new trail-side businesses – many for which winter (snowmobiling) is their primary business season despite the Black Hills having heavy summer tourism. Its model of aggressive trail grooming from a central hub has proven to be successful; this same template has strong potential to work well in helping grow New Brunswick's snowmobile tourism in the heart of Northern Odyssey.

Photo 4: Trailshead Lodge in the Black Hills; its primary season is winter (snowmobiling)

BACKGROUND SETTING AND ISSUES

Mount Carleton Provincial Park is centrally located within the Northern Odyssey tourism region.

Map 1: Existing snowmobile trails in the Northern Odyssey region; Mount Carleton is in the center



Mount Carleton Provincial Park and the Christmas Mountains area have a long snow season: The immediate region including and surrounding the Park has a winter season that is up to six months long. Environment Canada weather station data summarized in Tables 1 and 2 below shows the area typically begins to receive substantive snowfall in November that continues through April.

Table 1: Average Monthly Snowfall (cm)

Station Location	November	December	January	February	March	April	Annual
Mount Carleton Park Elevation: 265.10 m	26.9	65.6	74.9	54.7	56.9	30.1	317.7
Nictau Elevation: 169.7 m	28.9	62.6	75.9	58.6	47.5	21.9	300.3
Kedgwick Elevation: 274.3 m	34.6	63.0	59.5	52.5	48.0	25.1	287.5
South Tetagouche Elevation:182.9 m	33.5	59.5	80.9	55.7	64.1	35.4	339.0
Bathurst Elevation: 4.6 m	30.3	72.5	69.0	53.1	54.3	33.4	314.2
Miramichi Elevation: 32.9 m	26.7	60.3	70.3	54.6	64.3	29.6	310.1
Doaktown Elevation: 57.0 m	20.9	59.4	73.0	53.2	55.8	22.4	286.7

Table 2: Average Days with >= 0.2 cm Snowfall (cm)

Station Location	November	December	January	February	March	April	Annual
Mount Carleton Park Elevation: 265.10 m	8.66	18.32	19.82	15.37	14.80	8.28	86.60
Nictau Elevation: 169.7 m	8.66	17.73	19.23	15.08	12.03	5.86	80.26
Kedgwick Elevation: 274.3 m	9.74	16.76	15.64	13.43	11.90	7.91	77.47
South Tetagouche Elevation:182.9 m	7.19	13.95	16.56	12.20	12.35	7.94	72.30
Bathurst Elevation: 4.6 m	8.30	19.13	17.81	14.94	14.08	9.19	84.10
Miramichi Elevation: 32.9 m	8.17	17.67	19.00	15.17	16.57	8.96	87.50
Doaktown Elevation: 57.0 m	6.03	15.71	17.10	12.81	12.83	6.14	71.60

Additional Environment Canada weather station data, which is based on its '1971-2000 Averages,' is provided in Appendix 1 and includes tables for Average Snow Depth at Month-end, Historic Extreme Snow Depth, and Average Daily Temperature.

Good snow conditions generally continue well through April in the Christmas Mountains region south of Mount Carleton, as shown in Photo 5 which was taken in mid-April.

Photo 5: Snowmobiling in the Christmas Mountains on April 14, 2013

Mount Carleton Provincial Park is currently connected to the New Brunswick snowmobile trails system: Three of the Federation's snowmobile trails – Provincial snowmobile trail #19 and Local snowmobile trails #149 and #504 – currently enter or cross fringe areas of the Park. Provincial snowmobile trails #22, #23, #28 and #58, along with Local snowmobile trails #200, #201, #205, #206, #209, #301, #302, #303, #502 and #503, are also already established and groomed by snowmobile club volunteers as part of the snowmobile trail network connecting region communities to the Park.

Most current trail grooming operations are based a long distance from Mount Carleton Provincial Park and are currently at full capacity: Five club-operated grooming operations currently reach or come near Park boundaries. These grooming clubs include Club Motoneige de St. Quentin, the Victoria County Snowmobile Club (Plaster Rock), the Miramichi Snow-Goers Snowmobile Club (Doaktown), the Nepisiguit Sport Lodge Snowmobile Club (Bathurst), and Club Motoneige Chaleur (Bathurst).

The five clubs provide all trail maintenance, signing, and grooming services with club-owned equipment on 1,179 kilometers of snowmobile trails within this region. Club volunteers are currently operating at full capacity, or even over-extended, since all grooming bases are located a long distance via snowmobile trails from the Park. Since groomers surface snowmobile trails at an average of 7 to10 kilometers per hour, Table 3 shows the closest trail groomer to Mount Carleton is 5 to 7.1 hours away while the furthermost is located 18.5 to 26.4 hours away via the most direct route. Consequently trails in the center of Northern Odyssey around the Park receive far less grooming and maintenance attention than what clubs are able to provide on trails closer to their home communities.

Table 3: Grooming Distance and Time to reach Mount Carleton Park Headquarters

Grooming Base	One-Way Distance to Mt. Carleton Park (km)	One-Way Grooming Hours to Mt. Carleton Park (at 7 to 10 km/hr)
Club #33: Motoneige St. Quentin	50	5 to 7.1
Club #39: Victoria County (Plaster Rock)	82	8.2 to 11.7
Club #4: Motoneige Chaleur (Bathurst)	110	11 to 15.7
Club #1: Nepisiguit Sport Lodge (Bathurst)	161	16.1 to 23
Club #22: Miramichi Snow-Goers (Doaktown)	185	18.5 to 26.4

Photo 6: an 18+ hour roundtrip is currently required for this groomer to maintain snowmobile trails from St. Quentin to east of Mount Carleton Provincial Park

The elevation at Mount Carleton Provincial Park headquarters would be favorable for a grooming operations base: Elevation is a prime predictor of snow conditions and snow longevity since, generally, temperatures decrease and snowfall increases at higher elevations. Table 4 below shows elevation differences between existing grooming bases and common snowmobiling locations and destinations.

Table 4: Comparison of Elevations: Grooming Bases and Riding Areas

Grooming Base	Elevation (meters)	Riding Areas: Trail Locations and Destinations	Elevation (meters)
Bathurst	15	Riley Brook / Bear's Lair	183
		Rogers Lake	244
Doaktown	101	Popple Depot / Governors Wilderness Resort	265
Plaster Rock	134	Piston Alley on Trail #23	418
Chaleur / Sormany	210	Serpentine Lodge	434
St. Quentin	285	Christmas Mountains, south of Popple Depot	750
Mt. Carleton Park Headquarters (proposed)	260	Mt. Carleton summit	820

Existing snowmobile trail grooming equipment operated by volunteers is heavily used in the region: Table 5 shows primary existing club groomers work an average of 320 to 900 hours per year. This effort is substantial and equates to over 4,700 hours donated by club volunteers to operate groomers. There is no 'surplus of time' available whereby existing equipment and particularly volunteer operators could effectively provide additional trail grooming in the region since many clubs are already over-extended.

Table 5: Existing Trail Grooming Equipment in immediate project area

Grooming Club # and Name	Total KM of Trail	Tractor Year	Tractor Model	Tractor Hours (as of 11/2012)	Drag Model & Size	5-Year Average Annual Grooming Hours
#1 Nepisiguit Sport Lodge	285	2011	Lamtrac 5200	1843	Mogul Master 10x18'	907
		2011	Lamtrac 5200	1562	Mogul Master 10x18'	768
#4 Motoneige Chaleur	186	1999	Lamtrac 4050	8000	Lamtrac 9.5x16'	580
		2010	New Holland T 6070 Soucy	1800	Mogul Master 10x18'	769
#22 Miramichi Snow-Goers	348	2001	New Holland TM 125	3613	Sur Trac 9x20'	404
		1997	Tucker 1000	3491	Mogul Master 8x18'	113
		2000	New Holland TS 110	2540	Sur Trac 9x20'	284
#33 Motoneige St. Quentin	142	2011	Tucker 2000	711	Mogul Master 9x18'	562
#39 Victoria County	218	1996	Tucker 2000	1857	Mogul Master 10x20'	320

Additional trail grooming equipment would be needed to establish a new grooming base at Mount Carleton Provincial Park: Acquisition of additional equipment would help provide timelier trail grooming in the center of Northern Odyssey, resulting in improved trail quality. Additional equipment would also enable adding new trail segments and loops around Mount Carleton to increase grooming efficiencies and snowmobiling opportunities.

Establishing a new grooming base at Mount Carleton Park Headquarters could be beneficial since its elevation is higher than four of the five – and substantively higher than three of the five – other existing grooming base locations. The lower elevations at Bathurst, Doaktown, and Plaster Rock in particular can create situations where trail groomers cannot get out of the grooming base early or late in the season due

to poor snow conditions down low – yet snow at higher elevations around Mount Carleton and the center of Northern Odyssey can be plentiful and in need of grooming. This typically results in grooming not reaching the Mount Carleton region until Christmas, a month or more after snow has begun to accumulate in the Park, and ceasing in March, up to a month before the winter season typically ends around the Park.

The addition of a grooming base at Mount Carleton would help get snow compacted on trails in the center of Northern Odyssey in a more timely manner throughout the winter, as well as address early and late season grooming issues. This grooming presence would help establish snowmobile trails earlier for November-December snowmobile tourism and also help extend snowmobile trail use later in April.

New Brunswick snowmobile registration and permit sales have continued to increase over the past seven years. Snowmobiling is alive and well in the province. Table 6 shows the growth in snowmobile registration and trail permit sales since the 2005-2006 winter season. Snowmobile registration numbers have increased by 4,535 (46.8%) over this period, while total trail permit sales have increased by 3,635 (38.1%). Annual revenue from these sales has also increased by $535,376 (50.1%) over this period.

Table 6: Snowmobile Registrations and Permits History of Revenue & Number Sold per Season

Category	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Snowmobile Registrations #	9,687	10,367	12,213	13,778	13,619	14,916	14,422
Registration Revenue $	145,305	155,505	305,325	344,450	340,475	372,900	360,550
Trail Permits (all types) #	9,536	9,320	11,314	12,047	12,221	12,866	13,171
Permits Revenue $	1,067,775	927,428	1,119,953	1,380,746	1,431,302	1,568,290	1,603,151
Total Revenue $	1,213,080	1,082,933	1,425,278	1,725,196	1,771,777	1,941,190	1,963,701

Snowmobile trail development furthers goals of the 2010 Mount Carleton Provincial Park Master Plan Update. The updated Master Plan recommends "Year Round Operation complete with snowmobiling, ice fishing, cross-country skiing, and winter camping / cabins." Section 4.3.2 Trails states, "Controlled use of snowmobiles on designated trails has minimal impact on the Park and does not interfere with other users."

Northern New Brunswick is a premier snowmobile tourism destination. The Northern Odyssey region already serves as a premier snowmobiling destination. This status could be enhanced with additional trail grooming and more snowmobile trails in the Mount Carleton and Christmas Mountains area, as will be addressed through this plan. The region's position in the northern Appalachian Mountains provides spectacular scenery and abundant snowfall that is extremely attractive to snowmobiling tourism. Over the long term enhanced trail grooming and new trail opportunities should drive additional private and public partnerships for expanded tourism infrastructure, including lodging and other on-trail services.

Photo 7: Trail #503 north of Popple Depot

WINTER TOURISM INDICATORS

Winter visits represent 26% of annual tourism visits across the province of New Brunswick, with an average of 714,000 visits of one or more nights occurring between November and March. New Brunswick residents represent, on average, 61% of these winter visits. About 21% of overnight trips in the province during winter months are related to 'Pleasure-Vacation-Holidays' compared to 64% being to visit friends and relatives. (*New Brunswick Department of Tourism and Parks Strategic Planning and Policy Branch – Briefing on Winter Tourism in New Brunswick, March 12, 2012*) Occupancy trends for the overall Northern New Brunswick Region, including the Acadian Peninsula, for 2010 through 2012 are summarized in Table 7:

Table 7: Available Room Nights – percent of occupancy

Area	November	December	January	February	March	April	Annual
2010: Total Province	50	34	35	43	46	45	51
2011: Total Province	49	34	35	44	46	43	50
2012: Total Province	46	NA	37	43	46	42	52
2010: Acadian Peninsula & Northern NB Region	43	34	32	38	43	37	48
2011: Acadian Peninsula & Northern NB Region	42	29	35	42	45	36	46
2012: Acadian Peninsula & Northern NB Region	41	NA	31	37	39	32	46

Table 8 provides a closer snapshot of lodging occupancy rates for the Northern Odyssey Region, from November 2010 through December 2012, with the Acadian Coastal Drive communities excluded. Room occupancy for the region averages slightly over 30% and is lower than the overall winter lodging occupancy rates for the province and the northern region.

Table 8: Northern Odyssey Region winter occupancy rates, with Acadian Coastal Drive excluded

Month	US & Other International Visitors	Canadian Visitors: from out of province	New Brunswick Residents	Total Rooms Sold	Total Rooms Available	Occupancy Rate %
Nov. 2010	484	6,896	11,114	20,321	61,260	33%
Dec. 2010	451	5,880	9,110	16,166	62,576	26%
Jan. 2011	516	5,978	9,649	17,545	62,772	28%
Feb. 2011	587	6,307	9,754	18,691	56,686	33%
Mar. 2011	474	7,475	11,164	21,122	61,983	34%
Apr. 2011	542	7,409	10,173	20,034	60,270	33%
Season Total	3,054	39,945	60,964	113,879	365,547	31%
Nov. 2011	508	6,992	12,201	22,619	60,540	37%
Dec. 2011	513	5,764	8,026	16,253	61,848	26%
Jan. 2012	641	6,591	8,886	18,330	61,659	30%
Feb. 2012	537	6,387	9,581	19,243	57,971	33%
Mar. 2012	572	7,660	11,042	22,144	62,372	36%
Apr. 2012	828	7,969	9,407	20,640	61,545	34%
Season Total	3,599	41,363	59,143	119,229	365,935	33%
Nov. 2012	574	7,300	10,255	21,369	59,741	36%
Dec. 2012	460	6,304	7,795	16,682	61,334	27%

While a wide range of winter lodging options are available within the Northern Odyssey region, this lodging is generally located in communities along the outside perimeter of the region. There are four lodges/inns in the center of the region that offer approximately 20 units total and are extremely popular with snowmobilers. Mount Carleton Provincial Park also has eleven chalets, but none are currently winterized and available for winter use.

New Brunswick Snowmobile Tourism Economic Impact Study: 2008-2009 Snowmobile Season

The 2009 Snowmobile Study provides a wealth of information pertaining to snowmobile use trends across the province, as well as pertinent to the Northern Odyssey tourism region. Key finding include:

New Brunswick Residents

- 79% of reported same-day snowmobile destinations and 89% of overnight snowmobile destinations were in Northern New Brunswick
- Average distance covered on same-day out of town trips averaged 245 kilometers
- Total spending per party on same-day snowmobiling trip averaged $136.96 per day
- Average total distance covered on overnight trips was 1,050 kilometers, or 336 kilometers per night
- Total spending per party on overnight snowmobiling trips averaged $604.58 per day

Non-Residents

- 81% of reported same-day snowmobile destinations, and 95% of overnight snowmobile destinations, were in Northern New Brunswick
- While 48% indicated their motivation for taking a snowmobiling trip to New Brunswick was simply to 'go snowmobiling,' 38% of visitors from New England states indicated the 'quality of trails' motivated them to travel to New Brunswick
- Average distance covered on same-day out-of-town trips averaged 256 kilometers
- Average total distance covered on overnight trips was 1,292 kilometers, or 310 kilometers per night
- Total spending per party averaged $1,626.48 per trip

Table 9 shows the popularity of current snowmobiling destinations within the Northern Odyssey region:

Table 9: Snowmobile Visitor Destinations

Snowmobiling Trip Destinations	Resident % of Same-Day Trips	Resident % of Overnight Trips	Non-Resident % of All Trips
Bathurst	45	45	61
Campbellton	21	29	44
Miramichi area	20	17	32
Edmundston	19	26	44
St. Quentin-Mt. Carleton-Kedgwick-Riley Brook	19	21	27
Governors Wilderness Lodge (Trail #23)	19	12	18
Doaktown	13	1	0

Table 10 on the next page provides a breakdown of non-resident snowmobile visitor origin, along with the popularity of current snowmobiling destinations within the Northern Odyssey region for non-residents. For overnight resident and non-resident trips, the lower percentage destination numbers to St. Quentin / Mt. Carleton and particularly Governors Wilderness Lodge are likely due to: 1) much lower total lodging capacity than in the top four cities and 2) the lack of a connecting trail through Mount Carleton Provincial Park makes it more difficult to access this lodging from some of these riders' starting point.

Table 10: Non-Resident Destinations by Visitor Origin

Non-Resident Snowmobiling Trip Destinations	% of Snowmobile Visitor Origin		
	Nova Scotia & PEI	Quebec	New England States
Bathurst	83	32	35
Campbellton	41	45	56.5
Miramichi	48	7	21
Edmundston	28	59	78
St. Quentin (Mt. Carleton)	24.5	27	39
Governors Wilderness Lodge (Trail #23)	29	2	9

During the 2008-2009 New Brunswick snowmobiling season, 11,683 Federation trail permit holders reported taking an estimated 52,000 snowmobile trips. Of the New Brunswick snowmobile destinations reported, 87% were in northern New Brunswick.

Federation trail permit holders spent an estimated $12.3 million while on these trips, including $5.4 million on fuel and vehicle operation expenses, $4 million on food and beverages in New Brunswick restaurants and stores, and $1.2 million on New Brunswick accommodations. These tourism expenditures generated $22.5 million in economic activity within the province, and provided an estimated $1.4 million in provincial tax revenues. This economic activity from snowmobiling is estimated to support the equivalent of 239 full-time jobs across the province.

New Brunswick experienced inflation rates of 4.3% in 2010, 4.7% in 2011, and 2.9% in 2012 (www.statcan.gc.ca/). Consequently updating 2009 impact numbers to 2012 dollars shows total snowmobile trip spending equals $13.8 million, total economic activity equals $25 million, and provincial tax revenues equal $1.57 million per year.

Table 11 shows typical snowmobile visitor spending characteristics for groups and individuals. On average each New Brunswick resident spends an average of $34.24 per day while on an out-of-town same-day trip. For overnight snowmobile trips, New Brunswick residents spend an average of $50.38 per person for each night they are away, while nonresident snowmobile visitors spend an average of $69.51 per person each night they are in New Brunswick snowmobiling.

Table 11: 2009 Snowmobile Visitor Spending Characteristics

Visitor Type	Resident Trip Spending Characteristics	Non-Resident Trip Spending Characteristics
New Brunswick **RESIDENT**: out-of-town same **DAY TRIP**	$136.96 per group	
	Average group size = 4	
	$34.24 per person per day	
New Brunswick **RESIDENT**: **OVERNIGHT TRIP**	$604.58 per group	
	Average # nights/trip = 4	
	Average group size = 3	
	$201.53 per person per trip	
	$50.38 per person per night	
NON- RESIDENT (all origins): **OVERNIGHT TRIP**		$1,626.48 per group
		Average # nights/trip = 5.2
		Average group size = 4.5
		$361.44 per person per trip
		$69.51 per person per night

Table 12 updates snowmobile visitor spending amounts for groups and individuals to '2012 dollar' values:

Table 12: Snowmobile Visitor Spending Characteristics – updated to '2012 dollars'

Visitor Type	Resident Trip Spending Characteristics	Non-Resident Trip Spending Characteristics
New Brunswick **RESIDENT**: out-of-town same **DAY TRIP**	$153.90 per group	
	Average group size = 4	
	$38.48 per person per day	
New Brunswick **RESIDENT**: **OVERNIGHT TRIP**	$679.37 per group	
	Average # nights/trip = 4	
	Average group size = 3	
	$226.46 per person per trip	
	$56.61 per person per night	
NON- RESIDENT (all origins): **OVERNIGHT TRIP**		$1,827.66 per group
		Average # nights/trip = 5.2
		Average group size = 4.5
		$406.15 per person per trip
		$78.11 per person per night

New Brunswick snowmobilers cover a lot of area on their trips. The average distance traveled on snowmobile outings range from 245 to 336 kilometers per day as shown in Table 13. This travel results in an average of 44 to 61 liters of gasoline being consumed per day of snowmobiling.

Table 13: Average Daily Snowmobile Trip Distances and Fuel Use

Visitor Type	Average Daily Distance Traveled (KM)	Average Daily Fuel Use (L)*
Resident: Same-Day out-of-town trip, per day	245	44.5
Resident: Overnight out-of-town trip, per night	336	61.1
Non-Resident: overnight trip, per night	310	56.4

*Based upon average snowmobile fuel consumption of 5.5 liters per kilometer (13 miles/gallon)

Photo 8: Fuel is a large part of snowmobiler's trip expenditures; sleds in line for gas at Governors

IDENTIFICATION AND ANALYSIS OF ISSUES

A number of issues must be considered and addressed in order to grow snowmobile tourism in the Northern Odyssey region by providing additional trail grooming to improve and expand snowmobile trail opportunities in the region's center around Mount Carleton Provincial Park. These issues include:

1. Determine potential for expanding snowmobile trails within the Mount Carleton area to create new trail segments and loops to improve grooming efficiencies and expand snowmobiling opportunities.
2. Determine how the addition of new snowmobile trail routes would affect trail grooming efficiencies.
3. Determine what infrastructure additions or improvements would be required within the Park and surrounding area if a new trail grooming base is created at Mount Carleton Provincial Park headquarters. This could potentially include new or upgraded trail bridges, new or upgraded trail signing, additional trail shelters, upgraded winter parking, upgraded or additional shop or storage facilities at the Park, upgraded fuel storage at the Park, and upgraded lodging at the Park.
4. Determine what additional trail grooming equipment would be required for a Park grooming base, along with annual operating costs and a long-term replacement cycle.
5. Determine what Park staffing changes or additions would be required to establish winter operations.
6. Determine if public gasoline sales or public lodging is desirable or necessary at Mount Carleton Provincial Park during the winter season.
7. Determine all potential costs to implement improved and expanded snowmobile trail opportunities in the Mount Carleton and Christmas Mountains area.

Potential New Snowmobile Trails

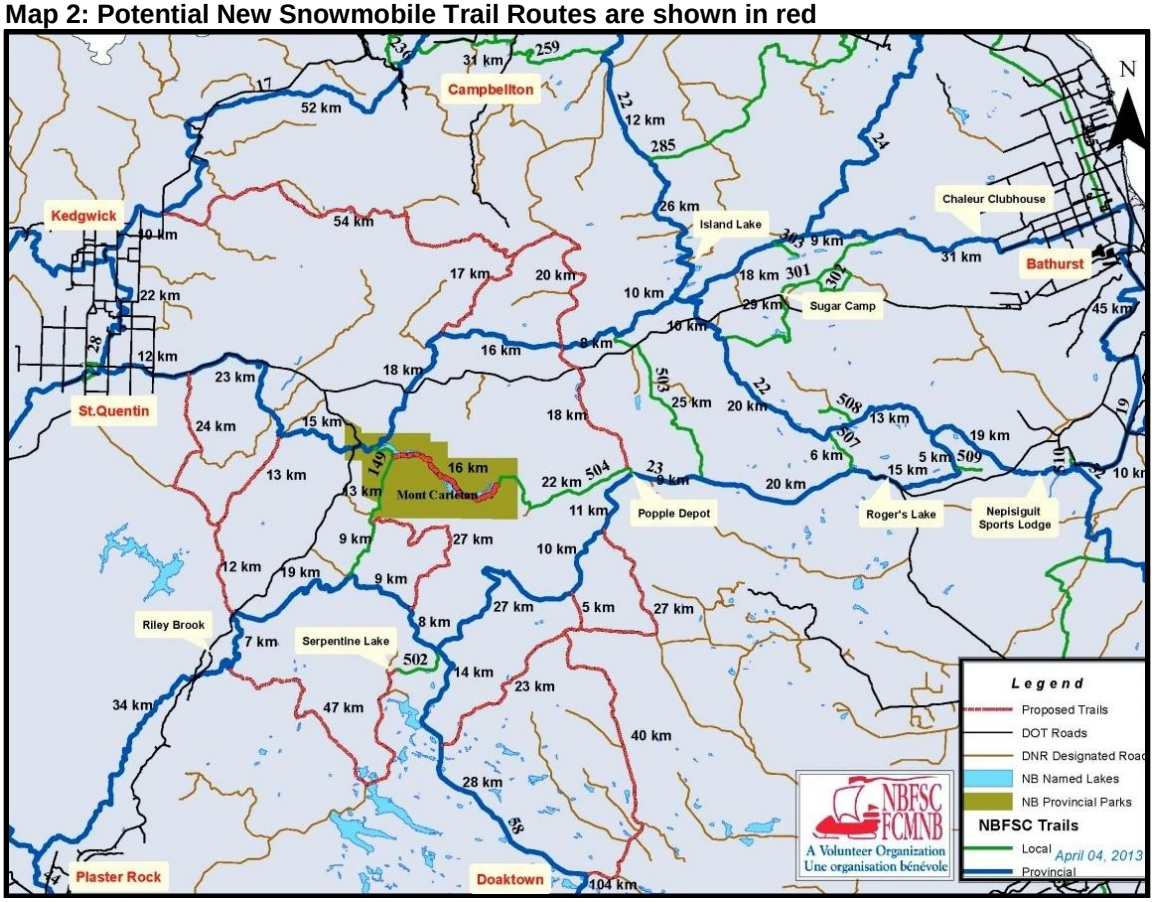
A total of 343 kilometers of potential new snowmobile trail routes have been identified in the area surrounding Mount Carleton Provincial Park. All potential new trail routes are on existing roads controlled by the New Brunswick Department of Natural Resources (DNR), with the exception of one 16 kilometer connecting link through the Park. All of the DNR roads which have been identified would require on-the-ground coordination and approval by DNR prior to being added to the snowmobile trail system. This coordination has not yet occurred due to the preliminary status of this overall concept and business plan. The connecting link through the Park has been preliminarily coordinated with the Park, but would require the installation of two trail bridges to facilitate trail grooming and which are discussed in-depth below in the Potential Infrastructure section. Table 14 outlines 14 potential new trail segments:

Table 14: Potential New Snowmobile Trail Segments

Segment	Potential New Trail Segment Description	Length (km)	Jurisdiction
1	From Trail #504 west thru Park to Trail #149	16	Parks
2	Little Tobique Road, south from Trail #19	13	DNR
3	Big Cedar and Green Bridge Roads, south from Trail #19	24	DNR
4	Green Bridge Road, north from Trail #23 near Riley Brook	12	DNR
5	Mount Edward Road, south of Mt. Carleton Park	27	DNR
6	Caribou Road, north from Trail #19	17	DNR
7	White's Brook Road, from Caribou Road west to Trail #17	54	DNR
8	Caribou Road and Main IP Road, north of Trail #19	20	DNR
9	Portage Road between Trails #19 and #504	18	DNR
10	River Road and Kagoot Brook Road, south of Trail #23	27	DNR
11	Bathurst Road, south from Trail #23	5	DNR
12	Birch Lake Road, east of Trail #58	23	DNR
13	Long Lake North Road, east of Trail #58	40	DNR
14	Serpentine Lake Road between Serpentine Lodge and Trail #23	47	DNR
	Total:	**343**	

Map 2 shows how potential new snowmobile trail routes (red) would interconnect with existing snowmobile trails (blue and green).

Map 2: Potential New Snowmobile Trail Routes are shown in red



Potential Changes to Snowmobile Trail Grooming Schedules and Efficiencies

Map 3 depicts existing grooming responsibilities by clubs around Mount Carleton in the Northern region.

Map 3: Current club grooming responsibility on existing snowmobile trails in project area

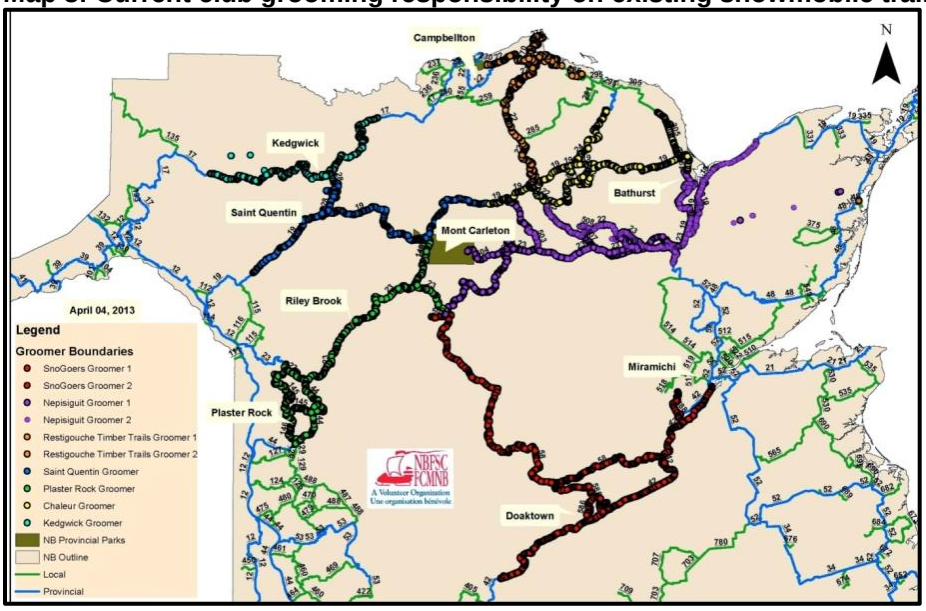


Table 15 outlines trail segments in the project area surrounding and leading to Mount Carleton Provincial Park which are all currently groomed by five local snowmobile clubs. Current overall grooming efficiency in the area is 53.2%. A grooming efficiency of 50% indicates that 100% of the trails in the area must be doubled (out and back on the exact same route) in order to be groomed one time – which is the case for Clubs #22, 33, and 34. Club #4's grooming efficiency on these trails is 51.9% due to one small loop while Club #1's grooming efficiency is 70.1% due to a longer side loop.

Table 15: Current Club Grooming Distances on trails within project area

Club # and Club Name	Trail / Grooming Segment	Trail Kilometers	Grooming Kilometers for 1 total repetition	Grooming Hours (10 km/hr avg.)
#1 Nepisiguit Sport Lodge Snowmobile Club (Bathurst)	Bathurst west on #23 to #507	94	188	18.8
	#23 west to #503	20	40	4
	#23 west to #504	9	18	1.8
	#23 southwest to #502	48	96	9.6
	#504	22	44	4.4
	#503	25	50	5
	#507	6	6	0.6
	#22 northwest to #301	20	40	4
	#22 from #507 to #23	13	13	1.3
	Total	**257**	**495**	**49.5**
	Grooming Efficiency		**51.9%**	
# 4 Club Motoneige Chaleur (Bathurst)	Clubhouse west on #19 to #301	31	62	6.2
	#19 west to #22	27	27	2.7
	#19 west to turnaround point	18	36	3.6
	#22 south to #301	10	10	1
	#301 northeast to #19	29	29	2.9
	Total	**115**	**164**	**16.4**
	Grooming Efficiency		**70.1%**	
#22 Miramichi Sno-Goers Snowmobile Club	Doaktown west and north on #58 to #502	146	292	29.2
	# 502 to Serpentine Lake	7	14	1.4
	Total	**153**	**306**	**30.6**
	Grooming Efficiency		**50.0%**	
#33 Club Motoneige de St. Quentin	# 19 east to Mt. Carleton Park	50	100	10
	#19 east to turnaround point	34	68	6.8
	Total	**84**	**168**	**16.8**
	Grooming Efficiency		**50.0%**	
#34 Victoria County Snowmobile Club (Plaster Rock)	#23 northeast to #149	60	120	12
	#23 southeast to #502	17	34	3.4
	# 149 north to Mt. Carleton Park	22	44	4.4
	Total	**99**	**198**	**19.8**
	Grooming Efficiency		**50.0%**	
Grand Total for project area:		**708**	**1,331**	**133.1**
Overall Grooming Efficiency within project area:			**53.2%**	

Tables 16 and 17 on the next two pages show how adding one groomer at Mount Carleton Park, along with adding only the 16 kilometer connecting link through the Park, could increase overall club grooming

efficiency from 53.2% to 55.4%. The park-based grooming would operate at 57.8% efficiency with one tractor, and overall grooming efficiency in the region would increase from 53.2% to 56.3%.

Table 16: Club Grooming Distances – Existing trails plus link thru Park plus 1 groomer at Park; number in parenthesis indicates decrease to club grooming from shifting trails to park-groomed

Club # and Club Name	Trail / Grooming Segment	Trail Kilometers	Grooming Kilometers for 1 total repetition	Grooming Hours (10 km/hr avg.)
#1 Nepisiguit Sport Lodge Snowmobile Club (Bathurst)	Bathurst west on #23 to #507	94	188	18.8
	#23 west to #503	20	40	4
	#23 west to #502 plus #503 & #504	(104)	(208)	(20.8)
	#507	6	6	0.6
	#22 northwest to #301	20	40	4
	#22 back east from #507 to #23	13	13	1.3
Total		**153**	**287**	**28.7**
Change from Existing Condition:		- 104 (- 40.5%	- 208 (- 42%)	- 20.8 (- 42%)
Grooming Efficiency		**53.3%** (+ 1.4%)		
# 4 Club Motoneige Chaleur (Bathurst)	Clubhouse west on #19 to #301	31	62	6.2
	#19 west to #22	27	27	2.7
	#19 west to turnaround point (now to #503)	10 (8)	20 (16)	2 (1.6)
	#22 south to #301	10	10	1
	#301 northeast to #19	29	29	2.9
Total		**107**	**148**	**14.8**
Change from Existing Condition:		- 8 (- 7%)	- 16 (- 9.8%)	- 1.6 (- 9.8%)
Grooming Efficiency		**72.3%** (+ 2.2%)		
#22 Miramichi Sno-Goers Snowmobile Club	Doaktown west and north on #58 to #502	84 (62)	168 (124)	16.8 (12.4)
	# 502 to Serpentine Lake	(7)	(14)	(1.4)
Total		**84**	**168**	**16.8**
Change from Existing Condition: - 45.1%		- 69	- 138	- 13.8
Grooming Efficiency		**50.0%** (no change)		
#33 Club Motoneige de St. Quentin	# 19 east to Mt. Carleton Park	50	100	10
	#19 east to turnaround point	(34)	(68)	(6.8)
Total		**50**	**100**	**10**
Change from Existing Condition: - 40.5%		- 34	- 68	- 6.8
Grooming Efficiency		**50.0%** (no change)		
#34 Victoria County Snowmobile Club (Plaster Rock)	#23 northeast to #149 (change to Green Bridge Road)	41 (19)	82 (38)	8.2 (3.8)
	#23 southeast to # 502 & #149	(39)	(78)	(7.8)
Total		**41**	**82**	**8.2**
Change from Existing Condition: - 58.6%		- 58	- 116	- 11.6
Grooming Efficiency		**50.0%** (no change)		
Club's Grand Total for project area:		**435**	**785**	**78.5**
Change from Existing Condition:		- 273 (- 38.6%)	- 546 (-41%)	- 54.6 (- 41%)
Overall Club Grooming Efficiency within project area:		**55.4%** (+ 2.2%)		

Table 17: Park-Based Grooming Distances – 1 grooming tractor based at Park; groom existing club trails near park, plus an added 16 km connecting link through Park

Mount Carleton Park-Operated Trail / Grooming Segment	Trail Kilometers	Grooming Kilometers for 1 total repetition	Grooming Hours (10 km/hr avg.)
#19 from park HQ to #503	42	42	4.2
#503	25	25	2.5
#23 west to #504	9	9	0.9
#504 and new link through park west to HQ (2x)	38	76	7.6
#149 from HQ south to #23 (3x)	22	66	6.6
#23 southwest to Green Bridge Road	19	38	3.8
#23 east from #149 to #502 (3x)	17	51	5.1
#23 from #502 to #504	48	48	4.8
#502 (3x)	7	21	2.1
#58 south to Hwy. 108	62	124	12.4
Park-Operated Total	**289**	**500**	**50**
Park-Operated Grooming Efficiency	**57.8%**		
Overall Region Total with adding 1 groomer and 16 km park connecting link			
Park-Operated Total for project area:	**289**	**500**	**50**
Club's Grand Total for project area:	**435**	**785**	**78.5**
Grand Total for project area:	**724**	**1,285**	**128.5**
Overall Grooming Efficiency within project area:	**56.3%**		

Note that additional details are provided in the Appendix regarding potential new grooming scenarios: Appendix 2 provides a full range of all potential new trails incorporated into potential grooming routes; Appendix 3 provides a potential grooming schedule for a '1 TRACTOR WITH 2 OPERATORS' scenario in the Mount Carleton Area that would groom existing trails, along with adding only the new trail link through the Park; Appendix 4 provides sample grooming schedule trip maps for the '1 Tractor' scenario outlined by Appendix 3; Appendix 5 provides an optimum potential grooming schedule for '2 TRACTORS WITH 4 OPERATORS' scenario in the Mount Carleton Area that would groom existing trails along with adding all potential new trails identified in the area; and Appendix 6 provides sample grooming schedule trip maps for the '2 Tractor' scenario outlined by Appendix 5.

Tables 18 shows how adding two groomers at Mount Carleton Park, along with adding all 343 kilometers of potential new snowmobile trails in and around the Park area, could potentially increase overall club grooming efficiency to 55.8%. In addition this scenario could improve park-based grooming efficiency from 57.8% with one tractor to 75.8% with two tractors if all potential new side loops are added. Overall grooming efficiency in the region would increase from 53.2% with just existing trails and club grooming, or 56.3% with adding one park-based groomer and the short link through the Park – to 67.8% overall.

Table 18: Park-Based Grooming Segment Distances – with 2 grooming tractors based at the Park and grooming all existing trails near park plus all potential new trail loops in the area

Mount Carleton Park-Based Trail and Grooming Segments	Trail Kilometers	Grooming Kilometers for 1 total repetition	Grooming Hours (10 km/hr avg.)
#19 from park north to Caribou Road	17	34	3.4
#19 from Caribou Road to Main IP Road	16	16	1.6
New: Caribou Road north from #19 to new trail from Kedgwick	17	17	1.7
New: Caribou & Main IP Roads back south to #19	20	20	2

#19 from Main IP Road to #503	8	8	0.8
#503	25	25	2.5
New trail: Portage Lake Road between #19 and #504	18	36	3.6
#23 from #503 to #504	9	9	0.9
#504 and new link through park west to park HQ	38	76	7.6
#23 from #504 to River Road	11	22	2.2
#23 from River Road to Bathurst Road	10	10	1
#23 from Bathurst Road to #58	27	54	5.4
New trail: River Road and Kagoot Brook Road, south off #23	27	27	2.7
New trail: Bathurst Road, south off #23	5	5	0.5
#502 (3x)	7	14	1.4
#58 south from #502 to Birch Lake Road	14	28	2.8
#58 south from Birch Lake Road to Long Lake North Road	28	28	2.8
New: Off #58, Birch Lake Road east to Long Lake North Road	23	23	2.3
New: Off #58, Long Lake Road north to Birch Lake Road	40	40	4
#23 from #502 to Mount Edward Road	8	8	0.8
#23 from Mount Edward Road to #149	9	18	1.8
#149 from park south to Mount Edward Road	13	26	2.6
#149 from to Mount Edward Road to #23	9	9	0.9
New: Mount Edward Road from #149 to #23	27	27	2.7
#23 from #149 to Green Bridge Road	19	19	1.9
New: south from Serp., w. to #23, n. to Green Bridge Rd. #23	54	54	5.4
New: Green Bridge Road to Little Tobique Road, off # 23	12	24	2.4
New: Little Tobique Road between Green Bridge Road & #19	13	13	1.3
New: Off #19,Big Cedar & Green Brdg. Rds. to L. Tobique Rd.	24	24	2.4
#19 from park west to Little Tobique Road	15	45	4.5
#19 from Little Tobique Road to Big Cedar Road	23	46	4.6
#19 from Big Cedar Road to St. Quentin	12	12	1.2
#28 & #17 from St. Quentin to Kedgwick	24	24	2.4
#17 north from Kedgwick to new loop east	10	10	1
New trail: east from #17 to Caribou Road	54	54	5.4
Park-Operated Total	**686**	**905**	**90.5**
Park-Operated Grooming Efficiency	**75.8%**		
Overall Total with adding 2 groomers and 343 km of new trails in the area			
Park-Operated Total for project area*	**686**	**905**	**90.5**
Club's Grand Total for project area**	**410**	**735**	**73.5**
Grand Total for project area*	**1,052**	**1,552**	**155.2**
Overall Grooming Efficiency within project area:	**67.8%**		

*Includes 44 kilometers of trail / 88 kilometers of grooming which overlap and are duplicative for St. Quentin & Kedgwick trails #17 and #28; consequently these have been removed from grand total

** With changes between a 1-tractor and 2-tractor schedule based at Mt. Carleton, total trail kilometers and grooming kilometers managed by local clubs would decrease slightly due to primary grooming responsibility changes: 1) St. Quentin – 38 km of #19 (76 km of grooming) between Big Cedar Road and Mt. Carleton would shift to being park-groomed; 2) Plaster Rock – 7 km of #23 (14 km of grooming) south of Green Bridge Road would shift to being park-groomed; and 3) Doaktown – 20 km of #58 (40 km of grooming) between Long Lake North Road and Hwy. 108 would revert back to being club-groomed. Net change would result in a total of 25 km of existing trail and 50 km of existing grooming being shifted to park-based grooming responsibility.

Table 19 shows that adding one groomer and a short connecting link through Mount Carleton Provincial Park would add only 16 kilometers of trail (plus 2.3%) while decreasing the total grooming effort required to completely cover all existing trails one time, by 46 kilometers (minus 3.5%). This would increase overall grooming efficiency by 3.1 percentage points compared to the existing grooming situation.

If a total of two additional groomers were to be added at Mount Carleton, along with adding a total of 344 kilometers of new trails (plus 48.6% in total trails) to create loop opportunities in the immediate region, the amount of grooming required to cover all existing and new trails once would increase by only 221 kilometers (plus 16.6%) resulting in a grooming efficiency of 67.8%. This would provide an increase of 14.6 percentage points compared to the existing grooming situation.

Table 19: Comparison of Potential Grooming Scenarios

Grooming Scenarios	Total Trail Kilometers in Project Area	Grooming Kilometers for 1 total repetition	Grooming Hours (10 km/hr avg.)	Grooming Efficiency Percentage
#1: Existing Situation – 100% of area trails are club groomed	708	1,331	133.1	53.2
#2: Add 1groomer at Mt. Carleton &16 km new trail link thru Park	724	1,285	128.5	56.3
Change from #1 to #2	**+ 16 (2.3%)**	**- 46 (3.5%)**	**- 4.6 (3.5%)**	**+ 3.1**
#3: Add 2 groomers at Mt. Carleton & 344 km of new trails in area	1,052	1,552	155.2	67.8
Change from #1 to #3	**+ 344 (48.6%)**	**+ 221 (16.6%)**	**+22.1 (16.6%)**	**+ 14.6**

The 344 kilometers of new snowmobile trail routes proposed to be added under scenario #3 would create new opportunities for snowmobile riders, as well as increase grooming efficiencies. It should be understood that this represents the maximum potential changes since actual new trails, and consequently final grooming abilities and efficiencies, will be subject to coordination of new routes with, and approval by, the DNR. The final scenario will take time to evolve and would likely be something less than all 344 kilometers being approved, yet it should be feasible to eventually add far more new trail routes than only 16 kilometers through the Park. In the end any new trails added will help improve grooming efficiencies by creating loops, which in turn will create new snowmobile riding / tourism opportunities.

Potential Trail Infrastructure Additions or Improvements

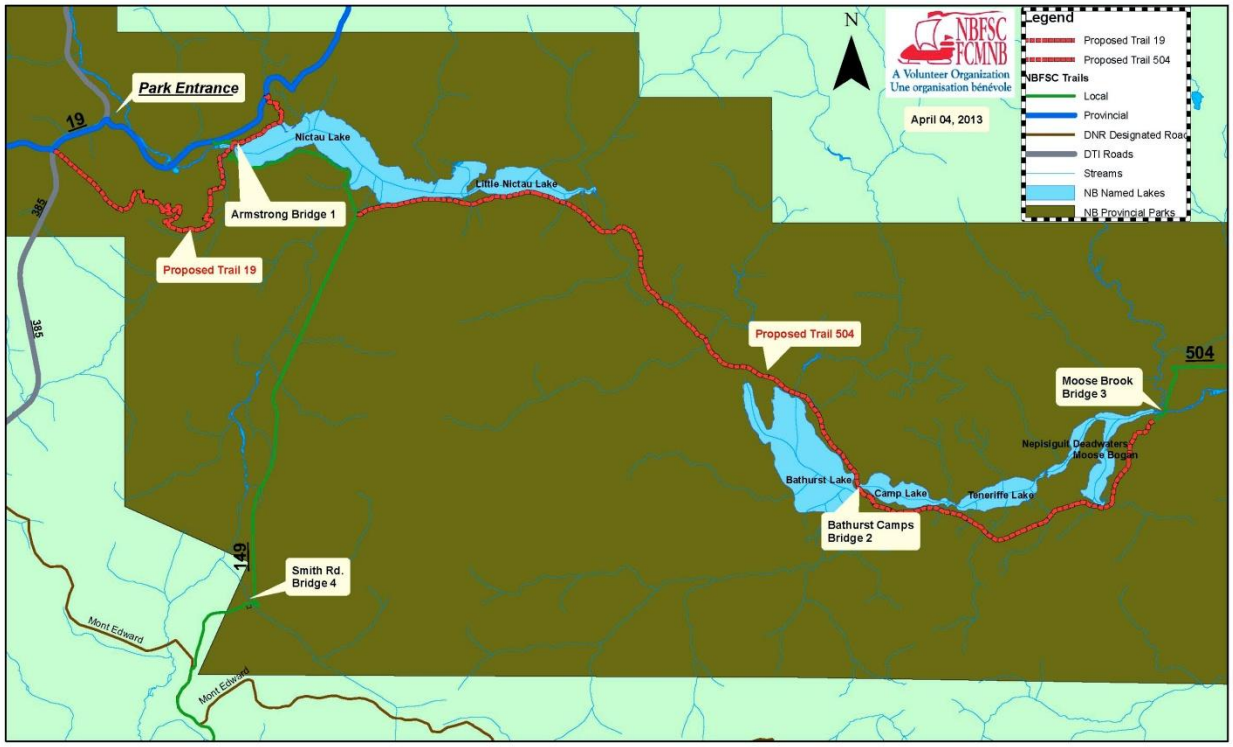
Bridges

Three sites within Mount Carleton Provincial Park would require new bridges to be installed in order to complete snowmobile trail connections on existing roads through the park. Two of these bridges over Moose Creek and Bathurst Lake are critical to establishing an east-west grooming route on existing park roads. The third bridge over Armstrong Brook is essential for routing snowmobile traffic off plowed roadways near the park entrance and would connect to the Armstrong area of the park. A fourth existing bridge on the Smith Road in the park would require replacement of its existing deck and railing to upgrade it for increased snowmobile trail grooming and traffic.

Map 4 on the next page shows the locations of these four bridge sites within the park. It also shows the location of the new thru-park snowmobile trail which would utilize an existing road to connect existing

snowmobile trail #504 on the east side of the park to existing snowmobile trail #149 on the west side of the park. Additionally, it shows an approximately 1,000 meter long new trail which would be constructed, south of the park entrance near park headquarters, to relocate existing snowmobile and grooming traffic off of plowed roadways in the vicinity of the park entrance.

Map 4: Locations of 4 bridge sites & new snowmobile trail routes within Mt. Carleton Park (in red)



Bridge #1 – Armstrong Brook: This site will require a 43m Kimtone Truss Bridge. The project will require removing the debris and rock left from the old bridge and then installing new abutments, piers and the new bridge truss system. This bridge will require two 9m spans and two 12m spans. Removal of the existing debris and installing a new Truss Bridge is estimated to cost $202,410.

Photo 9: Existing remnants of old bridge over Armstrong Brook

Bridge #2 – Bathurst Lake Camps: This site will require removing the existing bridge and support structures and replacing them with a new 36.5m Kimtone Truss Bridge. The structure will have three equal spans with clearance under the bridge to accommodate boat traffic. Removal and replacement of this bridge with a new Truss Bridge is estimated to cost $158,063.

Photo 10: Existing Bridge over Bathurst Lake near Bathurst Camps

Bridge #3 – Moose Creek: This site will require removing the existing bridge and support structures and replacing them with a new Kimtone Truss Bridge. The new structure will be an 18.25m clear span structure. Removal and replacement of this bridge with a new Truss Bridge is estimated to cost $68,894.

Photo 11: Existing Bridge over Moose Creek

Bridge #4 – Smith Road: The current road bridge at this site needs the deck and railing replaced to ensure it can withstand heavy grooming equipment and snow loads. This site will require removal of the existing deck and railings and replacing it to NBTCI standards and specifications. This is estimated to cost $17,941.

Table 20 shows the total cost for all four bridges is $447,308.

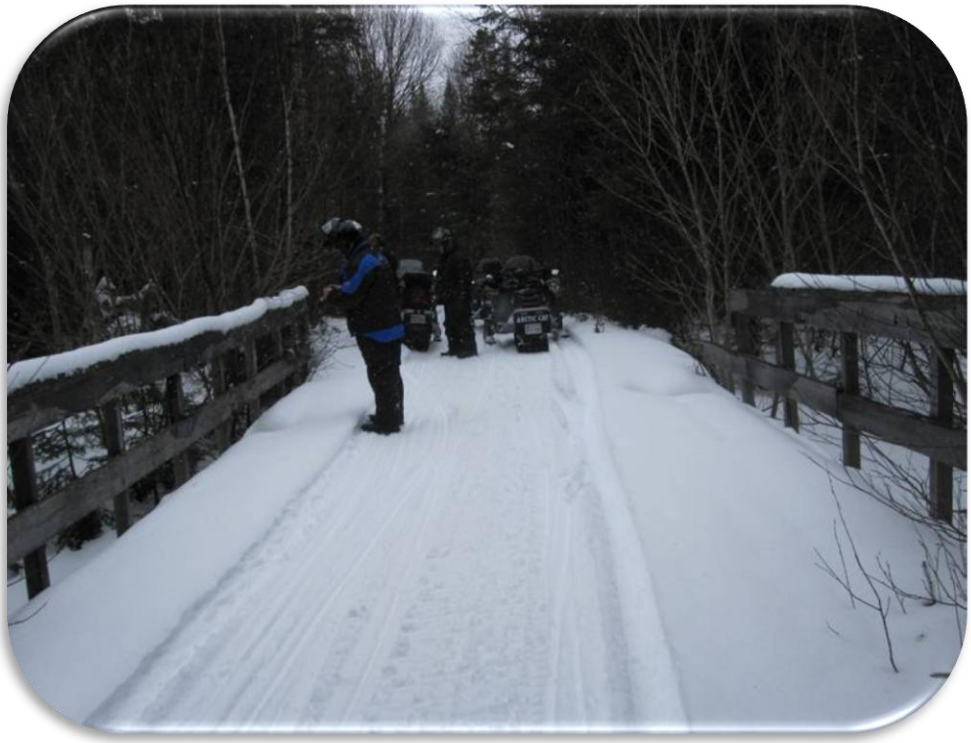


Photo 12: Existing Bridge on Smith Road

Table 20: Bridge Costs

Infrastructure Item	Total Cost $
Bridge #1: Armstrong Brook (43 m)	202,410
Bridge #2: Bathurst Lake Camps (36.5 m)	158,063
Bridge #3: Moose Creek (18.25 m)	68,894
Bridge #4: Smith Road – replace deck and rails	17,941
Bridges Total:	447,308

Trail Signing

The Federation installs a Permanent Sign Structure (PSS) at every trail intersection to help direct riders toward desired services and destinations. Either a 3-panel or 4-panel PSS is typically required at each intersection, depending upon whether it is a 3-way or 4-way intersection. A total of 19 additional PSSs would be needed to cover all new intersections which would be created by adding the 14 proposed new segments of snowmobile trails in the Mount Carleton region. Total cost for material and installation of these 19 new sign structures is estimated to be $18,487.

A total of 343 kilometers of new snowmobile trails are proposed to be added in and around the Mount Carleton area. These new trails will require a variety of new trail signs such as route markers, directional arrows, Stop and Stop Ahead sign, cautionary or hazard warnings, and additional informational signing. On average this will require about six new signs per kilometer of trail.

Photo 13: PSS intersection sign example

While each kilometer or segment of new trail will require different signing needs, it is estimated the average cost for signage and posts will be $102 per kilometer for a total potential cost of $34,986.

The existing snowmobile trails surrounding Mount Carleton are currently signed and maintained by local snowmobile clubs based in Bathurst, Miramichi/Doaktown, Plaster Rock, and St. Quentin. Consequently trails around the Park are generally a long distance from each club, at their farthest reach where volunteer work parties typically run short of time on their work days. As a result many of the existing snowmobile trails in the Mount Carleton region are currently signed at a lower standard that what is commonly found closer to the communities. Trail signing should be upgraded on approximately 330 kilometers of existing trails around the Park by adding an average of three new additional trail signs per kilometer of these existing trails. It is estimated the average cost for supplemental signage and posts will be $57 per kilometer for a total potential cost of $18,810.

Photo 14: Supplemental trail signing example

Table 21 shows the total cost for all trail signing improvements would be $72,283.

Table 21: Trail Signing Costs

Infrastructure Item	# of Units	Unit Cost $	Total Cost $
PSS intersection signs	19	973	18,487
New trail signing @ 6 signs/km average on new routes	343	102	34,986
Supplemental trail signing @ 3 signs/km on existing routes	330	57	18,810
Signing Total:			72,283

New Snowmobile Trail Routes: Clearing and Improvement

The 327 kilometers of potential new snowmobile trail routes outside of Mount Carleton Provincial Park are all located on open, existing DNR managed roadways. Consequently no brushing or clearing is anticipated to be needed if these roads are approved for winter snowmobile trail use.

The remaining 16 kilometers of proposed new snowmobile trail through Mount Carleton Provincial Park is also located on an existing road bed. The majority of this segment, from Big Nictau Lake to Bathurst-Camp Lakes, is on an open roadway where no clearing would be required. The remaining portion, from Bathurst Camps to Moose Brook, is located on an old slightly overgrown road bed which would require minor brushing and mowing at an estimated cost of $1,200.

Existing Trail #19 crosses Highway 385 as it approaches the Park from St. Quentin and then follows the shoulder of this plowed highway to the park entrance. From the park entrance the existing snowmobile

trail continues along the shoulder of plowed roadway until it turns off the plowed entrance road to cross onto groomed snowmobile trail once again at the Armstrong Brook road bridge. Snowmobile traffic connecting to Trail #19 from Snowmobile Trail #149 through the Park must also currently travel on a segment of plowed park roadway to make their connection. This situation is undesirable, particularly in early and late season when snow conditions are generally lower, as well as generally unsafe.

Photo 15: Snowmobile Trail #19 route on plowed Highway 385

A short reroute approximately 1,000 meters long is proposed to move this existing snowmobile trail route off the plowed roadways in this area. This new trail would go from where Trail #19 crosses Highway 385 toward and around park headquarters, cross the park entrance road, connect to the new Armstrong Brook trail bridge, and then use existing roads through the Armstrong campground area to again connect with Trail #19. There would also be a short spur cleared off this route to provide access to park headquarters by grooming equipment. Approximately 900 meters of this new trail would be cleared by an excavator with mulching head, while the remaining 100 meters is existing trails which would only need widening to accommodate a trail groomer. No surface work or culverts are required for this trail reroute. The estimated cost for this work is $10,660.

The existing trail to the Mount Carleton summit needs to be improved to provide access for winter visitors. This would require mowing and the removal of brush on 4.5 kilometers of trail between existing Snowmobile Trail #149 and the summit, with all brush being chipped on site. The existing landing at the summit would also be enlarged slightly to accommodate a groomer turn-around, as well as emergency helicopter landings. The estimated cost for this trail improvement is $1,800.

Photo 16: Existing trail to Mount Carleton summit

Table 22 shows the total cost for all trail clearing and improvements is estimated to be $13,600.

Table 22: New Trail Clearing and Improvement Costs

Infrastructure Item	Total Cost $
New snowmobile trail routes on 327 km of DNR roads	0
New trail route on 16 km of road thru Mt. Carleton Park	1,200
Trail re-route off plowed roads near Mt. Carleton Park entrance	10,660
Mount Carleton summit access trail improvement	1,800
New Trail Improvement Total:	13,660

Trail Shelters

The Federation and its clubs generally provide trail shelters at intervals along the provincial snowmobile trail system. These shelters have wood stoves for warming purposes and also serve as a safety shelter in the case of emergencies. A total of four new trail shelters are proposed to be strategically installed along new trail segments at an estimated total cost of $51,920.

Photo 17: Example of Existing Trail Shelter

An existing shelter in Mount Carleton Provincial Park, in the Armstrong campground, is also proposed to be added to the snowmobile trail system when Trail #19 connects to the new Armstrong Brook trail bridge and the reroute off plowed roadways. This shelter already has two wood stoves so could be utilized during the winter season for no additional development cost.

Photos 18 and 19: Exterior and interior of existing Armstrong Shelter

Table 23 shows the total cost for four new trail shelters with metal framing and siding is $51,920

Table 23: Trail Shelter Costs

Infrastructure Item	# of Units	Unit Cost $	Total Cost $
New shelters along new trail segments in the region	4	12,980	51,920
Existing Armstrong shelter at Mt. Carleton Park	1	0	0
Trail Shelter Total:			51,920

Table 24 summarizes the total potential *maximum* costs for trail infrastructure improvements. It should be noted that actual costs could be lower for 'new trail signing' if all 343 kilometers of the proposed DNR roads are not approved for use as snowmobile trails. Likewise, the actual number of new trail shelters needed could also decrease accordingly if all proposed new trail routes are not approved.

Bridges #2 and #3 at Bathurst Lake Camps and over Moose Creek, at an estimated total cost of $226,957, are critically necessary for establishing the 16 kilometer connector trail through Mount Carleton Park. Without these two new bridges the establishment of a new trail grooming base at the Park would not be possible. Bridge #1 over Armstrong Brook is necessary to complete the 'off-plowed roads' trail re-route to address safety issues at the Mount Carleton park entrance, and would also help address summer maintenance access needs between park headquarters and the Armstrong area.

Table 24: Summary of Total Potential *Maximum* Trail Infrastructure Improvement Costs

Trail Infrastructure Item	Total Cost $
Trail Bridges	447,308
Trail Signing	72,283
Trail Clearing and Improvement	13,660
Trail Shelters	51,920
Summary of Total Trail Infrastructure Costs:	585,171

Potential Park Infrastructure Additions or Improvements

Park Shop and Storage Buildings

It is important that trail grooming equipment be able to be serviced in a heated shop so tractors can periodically be completely thawed out for repair, inspection and service. It is also important that grooming tractors be stored indoors during non-winter months to protect rubber track components from exposure to the sun's UV rays.

Existing shop and storage facilities at Mount Carleton Park headquarters are adequate to establish an initial snowmobile trail grooming base at Mount Carleton Provincial Park. The three bays in the existing park shop are heated and large enough to accommodate tall grooming tractors. There is also likely sufficient room in existing cold storage buildings for summer storage of grooming tractors since park equipment would be in use when grooming equipment storage is most needed.

Photos 20 & 21: Existing cold storage (left) and heated shop (right) buildings at Mt. Carleton Park

Photos 22 and 23: Interior views of the 3 existing shop bays at the Mt. Carleton Park shop

Over the long-term it would be desirable to construct a new drive-thru shop / storage facility specifically for trail grooming equipment at Mount Carleton. This would enable a tractor-drag combination to be serviced indoors as a single operating unit, which is not possible in the existing park shop. It would also provide year-round inside storage for grooming equipment that would be out of the way of other park operations.

Using the Black Hills model for comparison purposes, South Dakota constructed a 30' x 60' 2-bay, drive-thru shop building in 1980 at its Hardy Work Center. This shop started as a cold storage building that was eventually insulated and heated. While this building could accommodate two grooming units parked side-by-side, there was not sufficient space to comfortably work on both units simultaneously, particularly if track maintenance was required.

Photo 24: the 1980 Black Hills shop

In 2010 they built another new 52' x 72' 2-bay drive-thru shop at a cost of about $700,000 to accommodate their growing trail grooming program. This new shop is wider and taller, has floor drains and in-floor heat, office space, bathrooms, welding station, and a parts room.

Photos 25 and 26: Exterior (left) and interior (right) views of new Black Hills shop built in 2010

Park Fuel Supply

There is currently one 1,000 gallon (3,785 liters) unleaded gasoline supply tank and one 500 gallon (1,893 liters) diesel fuel supply tank at the Mount Carleton Provincial Park headquarters fueling station. Additionally there is a second 3,000 gallon (11,356 liters) diesel fuel supply tank for the park's generator. This current fuel capacity is adequate for initially establishing a new trail grooming base at the Park, irrespective of whether it is a 1-tractor or 2-tractor trail grooming operation.

Photo 27: Existing Mt. Carleton fuel depot area

Park Staff Housing

The Mount Carleton Provincial Park headquarters administrative building currently has several dormitory type rooms used for employee housing during summer months. These rooms are generally unused during winter and would be sufficient if needed to house winter trail grooming employees with no additional modifications being required.

Photos 28 and 29: Mt. Carleton administrative building (left); example of dorm room (right)

Both Mount Carleton-based grooming scenarios (1-tractor and 2-tractor) propose two overnight stays per week at Serpentine Lodge for one groomer operator. This overnight stay would greatly increase trail grooming efficiency on Trail #58 south of Serpentine toward Doaktown, as well as for proposed new trail segments in the Christmas Mountains east of Serpentine Lodge. Trail #58 is currently club-groomed from Doaktown to Serpentine, and the club currently overnights at Serpentine due to the long distance. While Mount Carleton Park is closer to Serpentine than what Doaktown is, the existing trail south and the proposed new trails to the east are a long distance when added to the time/distance required to reach Serpentine from the Park; consequently continuing to overnight the groomer at Serpentine would be beneficial.

While Serpentine Lodge's owner has indicated he would not charge for this continued overnight stay, this is an important component of the proposed grooming plan that should be budgeted for to ensure it can happen if needed. Table 25 outlines the estimated annual costs for this overnight lodging and meals:

Table 25: Serpentine Lodge Overnight Lodging and Meal Costs

Cost Item	Average Cost per Day/Night	# of Days/Nights per Week	# of Weeks	Total Cost
1 Groomer Operator: lodging & meals	$100	2	18	$3,600
Overnight Lodging and Meals Total:				$3,600

Potential Trail Grooming Equipment Needs

Information presented in the Potential Changes to Snowmobile Trail Grooming Schedules and Efficiencies section above, beginning on page 15, shows the economies which can be gained by a Mount Carleton based 1-tractor and 2-tractor grooming scenario. Either scenario is dependent upon the 16-kilometer connecting link being added in the Park. If no other proposed snowmobile trail additions are approved on DNR roads outside the Park, only one trail grooming unit could be feasibly and effectively used in a park-based grooming operation. A second trail groomer would become desirable and necessary if any additional new snowmobile trail segments on DNR roads outside the Park are approved.

Photo 30: More trail grooming is the key to growth

It is recommended that any trail grooming tractors based at Mount Carleton Park be equipped with rubber versus steel tracks for the following reasons:

1. Existing Snowmobile Trail #23 between Mount Carleton and Serpentine Lodge, as well as Trail #502 into Serpentine Lodge, currently follow portions of plowed roadways. While in theory there is supposed to be room to groom beside the plowed roadway on the shoulder, this can become difficult or impossible during early or late season or whenever there are low snow conditions. Consequently grooming access on these routes could potentially become difficult or impossible with a steel-tracked groomer, causing a disruption to trail grooming beyond the plowed road segment.
2. Since most all snowmobile trail routes in the area are located on DNR roads, it is feasible there could be plowed roadways due to winter forestry or other DNR operation reasons, and consequently disruptions to snowmobile trail grooming abilities. Oftentimes snowmobiles can still negotiate their way through these disrupted areas if the distance is not excessively long. Likewise a rubber-tracked groomer would be able to put the wheels down on the grooming drag and drive down bare roads until it reaches snow cover again. A steel-tracked groomer cannot operate on bare roads without causing damage to the grooming equipment.
3. If the 'off-plowed roads' reroute is not accomplished within Mount Carleton Provincial Park, only a rubber-tracked groomer could safely access park headquarters on its plowed roadways.

The two available options for rubber-tracked grooming tractors include either a farm tractor conversion equipped with rubber tracks or a Tucker Sno-Cat TERRA. Examples of grooming tractors and a typical snowmobile trail grooming drag which is pulled behind a tractor are shown below:

Photos 31 and 32: Examples of rubber-tracked groomers – a farm tractor equipped with rubber Soucy tracks (left) and a Tucker TERRA with rubber tracks (right)

Photo 33: Groomer with steel track cleats **Photo 34: Example of a typical trail grooming drag**

An added advantage of a farm tractor conversion is that the tractor could be used in the park during non-winter months, either with its original factory wheels or with the rubber track kit. Therefore the tractor could be used for trail mowing or brushing with appropriate attachments, as well as for other park maintenance functions. A disadvantage of farm tractor conversions is that they are typically much heavier than manufactured snow grooming tractors, and depending upon the model, they may also be taller or wider than snow grooming tractors.

While the rubber-tracked Tucker could also be operated in the park during non-winter months, it would not be capable of being used with mower or brushing attachments. Grooming tractors with steel tracks cannot be operated off snow, during non-winter months, or with attachments like mowers or brushing attachments. Another disadvantage of steel-tracked grooming tractors is that they are typically hydraulic-driven versus gear-driven; this can complicate and increase the costs of maintenance and equipment repairs.

An important consideration for grooming the access trail to the Mount Carleton summit is that the grooming tractor must be able to maneuver and turn – while pulling the heavy grooming drag and also simultaneously dozing potentially deep snow or heavy snow drifts – when traveling up a steep grade. Generally a 4-tracked groomer is better suited than a 2-tracked groomer for this kind of uphill work while pulling a grooming drag.

If two grooming tractors are purchased, it is highly recommended they both be the same make and model to simplify maintenance as well as minimize repair part inventories. Table 26 provides estimated costs to purchase one or two new trail grooming tractors with drags. These costs would allow the purchase of a rubber-4-tracked vehicle, either the traditional snow grooming style tractor or a farm tractor conversion since total costs would be similar. Only one grooming tractor would need to be purchased if no other new snowmobile trails are added outside the Park, while two new tractors would be necessary if additional new snowmobile trails outside the Park are approved.

Table 26: Trail Grooming Equipment Potential *Maximum* Costs

Item	Total Cost $
Trail Grooming Unit: Tractor #1 with 9' grooming drag	236,000
Trail Grooming Unit: Tractor #2 with 9' grooming drag	236,000
Trail Grooming Equipment Total:	472,000

Potential Annual Operating Costs for Trail Grooming Equipment

The potential maximum number of annual grooming hours from a Mount Carleton grooming base are estimated in Table 27 for '1 tractor' and '2 tractor' grooming scenarios. While 'grooming season' in the area could potentially be up to 20 weeks long, snow conditions early and late in a 20-week season may not allow for full grooming repetitions. Consequently budget estimates are built upon the average of 18 weeks of full grooming work that would be intended to occur over a total of 20 weeks.

A 1-tractor operation would run six nights per week while maximizing use of the single tractor. Consequently the projected 1,271 hours of grooming would likely be achievable as long as snow conditions allowed a full 18 weeks of grooming activity during the 20-week long grooming season. On the other hand, all new trails would need to be approved and have an average of 18 full weeks of favorable grooming conditions during the 20-week long grooming season in order to groom the projected maximum 2,662 hours with two tractors.

Table 27: Mount Carleton-based tractors – total potential grooming hours

Grooming Tractor	Average Grooming Hours per Week	# of Weeks	Total Annual Hours
#1 in a '1 tractor' scenario	70.6	18	1,271
#1 in a '2 tractor' scenario	67.9	18	1,222
#2 in a '2 tractor' scenario	80	18	1,440
Total for a '2 tractor' scenario	147.9	18	2,662

Hourly operating costs for grooming tractors are estimated in Table 28. These cost factors are derived from State of Wyoming data averaged based upon 11 Tucker Sno-Cats owned and operated by the Wyoming State Trails Program. Detailed cost accounting records are kept for this Wyoming equipment which averages about 810 hours of use per Cat each season (some Cat use is significantly higher than 810 hours while other's annual use is significantly lower). Diesel fuel consumption for these Wyoming Sno-Cats averages 4.6 gallons per hour (17.4 liters per hour), although the typical engine load factor is likely higher in their mountainous terrain. Average Repair Part costs average about $11.00 per hour, with lubricants and routine service running about another $1.25 per hour (have indexed this upward to reflect higher Canadian petroleum costs). Total tractor operating costs are estimated to average $35 per hour of grooming.

Table 28: Typical tractor operating costs per hour

Cost Item	Cost Factor	Unit Cost	Hourly Cost $
Diesel Fuel	17.4 Liters per hour	$1.28/L	22.27
Lubricants and Service	Based upon WY average		1.73
Repair Parts	Based upon WY average		11.00
Total Hourly Operating Cost:			$35.00

For comparison a 5-year history of average 'per hour of grooming' payouts by the Federation to local clubs is summarized in Table 29. The overall average hourly payout to the five clubs within the Mount Carleton trail grooming region is $57.89 per hour. While this hourly rate is based upon 'grooming hours,' it represents clubs' reimbursement for all their costs (grooming equipment, grooming equipment operation, trail signing, etc. with most or all labor costs being from volunteers).

Table 29: 5-year History of Federation Payouts to Area Clubs

Club # and Name	Season	Total Annual Payout $	5-year Rolling Ave. Grooming Hours	$ Payout Per Hour
#1 Nepisiguit Sport Lodge	2007-2008	65,637.05	1,257.22	52.21
	2008-2009	81,966.61	1,381.68	59.32
	2009-2010	84,643.22	1,381.68	61.26
	2010-2011	97,614.22	1,451.3	67.26
	2011-2012	91,662.35	1,623.4	56.46
	Club's 5-Year Average:			$59.30
#4 Motoneige Chaleur	2007-2008	38,842.05	766.66	50.66
	2008-2009	46,775.62	825.6	56.66
	2009-2010	48,124.42	825.6	58.29
	2010-2011	53,217.86	808.5	65.82
	2011-2012	46,899.61	833.06	56.30
	Club's 5-Year Average:			$57.55
#22 Miramichi Snow-Goers	2007-2008	28,287.31	464.66	60.88
	2008-2009	33,381.56	538.58	61.98
	2009-2010	34,533.51	538.58	64.12
	2010-2011	40,761.64	607.68	67.08
	2011-2012	42,193.91	778.02	54.23
	Club's 5-Year Average:			$61.66
#33 Motoneige St. Quentin	2007-2008	21,659.02	490.34	44.17
	2008-2009	26,644.01	520.64	51.18
	2009-2010	26,674.88	520.64	51.23
	2010-2011	29,619.62	521.74	56.77
	2011-2012	24,805.18	531.24	46.69
	Club's 5-Year Average:			$50.01
#39 Victoria County	2007-2008	16,788.21	283.6	59.18
	2008-2009	18,766.87	335.98	55.86
	2009-2010	20,192.54	335.98	60.10
	2010-2011	20,740.54	295.7	70.14
	2011-2012	19,112.40	322.18	59.32
	Club's 5-Year Average:			$60.92
Region's Overall 5-Year Average Payout per Hour of Grooming:				$57.89

Table 30 shows estimated annual operating costs for '1-tractor' and 2-tractor' grooming scenarios based at Mount Carleton Provincial Park. These operating costs include fuel, repair parts, and routine service

but do not include labor for equipment operators. Estimated annual operating costs for a '1-tractor' scenario range from $44,485 per season based upon the $35 per hour Wyoming rate to $73,718 based upon $58 per hour club payout rate. Total estimated annual operating costs for a '2-tractor' scenario range from $93,170 per season based upon the $35 Wyoming rate to $154,396 based upon the $58 club payout rate.

Table 30: Mount Carleton-based tractors – estimated annual operating costs

Grooming Tractor	Total Annual Hours	@ $35/hour WY Rate	@ $58/hour Avg. Payout Rate
#1 in a '1 tractor' scenario	1,271	44,485	73,718
#1 in a '2 tractor' scenario	1,222	42,770	70,876
#2 in a '2 tractor' scenario	1,440	50,400	83,520
Total for a '2 tractor' scenario	2,662	93,170	154,396

Potential Park Staffing Needed for Grooming Program

Appendix 3 and Appendix 5 provide detailed example grooming schedules for a '1 tractor' and '2 tractor' grooming operation based at Mount Carleton Provincial Park. They also detail the number of operators and estimated weekly grooming hours for each employee. Keep in mind estimated grooming times in these example schedules are based upon an average grooming speed of 10 kilometers per hour; actual work times will vary depending upon current local conditions, actual weekly work hours will vary accordingly.

Two operators would be required for a fairly simple '1 tractor' grooming scenario as outlined in Table 31. It is anticipated Operator #2 would typically have about 7.5 hours available to perform weekly tractor service and maintenance, so no additional maintenance employee is included. While Operator #1 would typically groom about 39.1 hours, he would also spend an additional 0.9 hour performing miscellaneous maintenance to work a weekly total of 40 hours.

Table 31: Example grooming work week for '1 tractor' grooming scenario

Employee	Day1 Thurs.	Day2 Fri.	Day3 Sat.	Day4 Sun.	Day5 Mon.	Day6 Tues.	Day7 Wed.	Weekly Total
	Groom	Groom	Groom	Groom	Groom	Groom	Tractor Maintenance	
Operator #1	11.4	16.3	11.4					39.1
Operator #2				8.4*	13.8*	9.3	7.5	40
Tractor #1 Weekly Summary: Grooming Hours = 70.6; off for service on Wednesday								

* Operator #2 would stay over at Serpentine Lodge after the Sunday and Monday night grooming runs

A total of four operators would potentially be required for a '2 tractor' operation *if* all proposed new snowmobile trail routes are approved. This scheduling would be a bit more complex than a '1 tractor' operation yet would be easy to accomplish with each employee working three to four days each week.

Operator #2 would run Tractor #1 two nights and then Tractor #2 his third work night. Additionally Operator #2 and Operator #3 would split an extremely long grooming run in Tractor #2 by making an operator switch by vehicle at either Kedgwick or St. Quentin, depending upon whether the grooming run is done clockwise or counter-clockwise from the Park. In this '2 tractor' scenario Operators #2 and #3 would potentially have 1.4 to 3.6 hours each week were they would fill in their 'weekly 40 hours' by performing extra maintenance duties or by doing supplemental grooming around the park. Operator #4 would work four days and spend about 5.4 hours helping perform tractor service work on Wednesdays.

An example work week for the '2-tractor' scenario is shown in Table 32:

Table 32: Example Grooming Work Week for '2 tractor' grooming scenario

Employee	Day1 Thurs.	Day2 Fri.	Day3 Sat.	Day4 Sun.	Day5 Mon.	Day6 Tues.	Day7 Wed.	Total
	Groom	Groom	Groom	Groom	Groom	Groom	Tractor Maintenance	
Operator #1 Tractor #1	14.7	15	10.8					40.5
Operator #2 Tractor #1				13.5	13.9			27.4 + #2
Tractor #1 Weekly Summary: Grooming Hours = 67.9; off for service Tuesday-Wednesday								
Operator #2 Tractor #2	9							36.4
Operator #3 Tractor #2	10.1	14.2	14.3					38.6
Operator #4 Tractor #2				11.7*	13.3*	9.4	5.4	40
Tractor #2 Weekly Summary: Grooming Hours = 80; off for service on Wednesday								

* Operator #4 would stay over at Serpentine Lodge after their Sunday and Monday night grooming runs

For budgeting purposes, a 20-week long 'grooming season' that would potentially start the third week of November and run through the end of the first week of April is presumed. However as with tractor operating costs above, an average of 18 full weeks of grooming work is used for estimating the potential labor budget. This schedule would place the greatest emphasis on packing the snow base in early season, which will ultimately help extend the riding season further into spring. In practice grooming may occur past the first week of April since actual snow conditions generally allow budget savings during the heart of the winter which can be used to extend the end of grooming, as conditions warrant.

While snowmobile riding would continue in this area past the first week of April, trail grooming typically becomes less productive during warmer early spring weather conditions. Additionally spring riding conditions are generally good without much or any trail grooming since more frequent freeze-thaw cycles (cold nights with warm days), along with new typically wet snowfall, generally helps to self-level snowmobile trails more so in spring.

Table 33 shows total labor costs for a '1 tractor' grooming scenario are estimated to be $32,000 annually.

Table 33: Employee costs for a '1 tractor' grooming operation with 2 operators

Job Title	# of Employees	$ Cost per Hour	Weekly Hours	# of Weeks	Total Cost $
Groomer Operator	2	20.00	40	18	28,800
Labor Total:					28,800

Table 34 shows total labor costs for a '2 tractor' grooming scenario are estimated to be $64,000 annually.

Table 34: Employee costs for a '2 tractor' grooming operation with 4 operators

Job Title	# of Employees	$ Cost per Hour	Weekly Hours	# of Weeks	Total Cost $
Groomer Operator	4	20.00	40	18	57,600
Labor Total:					57,600

Potential Public Fueling Needs

An 'Analysis of Snowmobile Fuel Range as it applies to Fuel Sources in the Mount Carleton Region' was conducted to help assess the need for providing public gasoline sales at Mount Carleton Park. This analysis is summarized in Table 35 and was based upon the following assumptions and premise:

Assumption #1: the manufacturer's fuel capacity for snowmobiles range from about 9 to 11 gallons; consequently an average fuel capacity of 10 gallons (37.8 liters) per snowmobile has been used for the purpose of this calculation

Assumption #2: the average fuel economy for snowmobiles range from about 12 to 14 miles per gallon (5.1 to 5.9 kilometers per liter); consequently an average of 13 miles per gallon (5.5 kilometers per liter) has been used for this calculation

Resulting Premise: based upon an average fuel capacity of 37.8 liters per snowmobile and average fuel economy of 5.5 kilometers per liter of gasoline, the average snowmobile's fuel range is estimated to be approximately 208 kilometers per tank of gasoline

Table 35: Distance from Fuel Source; average snowmobile has fuel range of 208 kilometers / tank

Existing Fuel Source (FS)	Trail Destinations with Fuel	Segment Distance (KM)	Total Distance from FS (KM)
St. Quentin	To Mt. Carleton Provincial Park (MC) via #19 (no fuel)	46	92 roundtrip
	From MC to Riley Brook via #149 & 23	+ 41	87
	From MC to Serpentine Lodge via #149, 23, 502	+ 45	91
	From MC to Governors, south via #149 & 23	+ 86	132*
	From MC to Governors, north via #19, 503, 23	+ 81	127
	From MC to Governors, via new trail thru MC & #504	+ 42	88
	From MC to Kedgwick via new loop north of #19	+ 137	183
	From MC back to St. Quentin via new loop south of #19	+ 84	130
Bathurst	To Sugar Camp	61	61
	To Island Lake	64	64
	To Governors, north via #19, 503, 23	100	100*
	To Nepisiguit Sport Lodge (NL)	55	55
	From NL to Governors (G), south via #23	+ 65	120*
	From G to St. Quentin, via #504, 19 & new link thru MC	+ 88	143*
	From G to Serpentine Lodge (SL) via #23 & 502	+ 55	110*
	From G to Riley Brook via #23	+ 95	150*
	From G to Riley Brook via #504, new MC link, 149, 23	+ 93	148*
Plaster Rock	To Riley Brook (RB)	43	43
	From RB to Serpentine Lodge (SL) via #23 & 502	+ 54	97*
	From RB to Governors via #23	+ 95	138*
	From RB to G via #23, 149, new MC link, 504	+ 93	136
	From RB to SL via #23 & 502, then back to Plaster Rock via new loop south of SL and #23	+ 144	187*
Blackville / Doaktown	To Serpentine Lodge via #58 or 58 & 585	158	158
	To SL via #58, 585 and new loop to east & north of #58	185	185
Governors Wilderness Resort	To MC headquarters via #504 and new MC link (no fuel)	42	84 round trip
	From MC to Island Lake via #19 & 22	+ 63	105
	From MC to Sugar Camp via #19, 22, 301	+ 76	118
	From MC to Bathurst via #19	+ 113	155*

* presumes rider passed up an opportunity to refuel at a closer fuel source

This analysis arrived at the following conclusions:

- While snowmobile trail systems always benefit from added fueling opportunities, analysis shows this is not a critical necessity in the Mount Carleton region.
- Comparison of travel distances between region destinations and fuel sources against an average estimated fuel range of 208 kilometers per tank of snowmobile gas shows existing private business fuel sources in the region provide multiple options and adequately address the fuel needs of snowmobilers, regardless of how trip routes are mixed, as long as snowmobile riders pay attention and practice safe riding habits with good trip planning.
- It is not necessary to add public gasoline sales at Mount Carleton Provincial Park as part of initial efforts to expand snowmobile trail opportunities in the Mount Carleton region. This will decrease initial start-up costs, as well as eliminate potential points of resistance from private businesses in the region who could potentially become concerned about government competition.
- Existing gasoline storage and dispensing facilities at Mount Carleton Provincial Park headquarters are adequate to provide emergency fueling assistance to snowmobilers, if desired.

Photos 35 and 36: Examples of existing snowmobile gas sources at Serpentine Lodge (left) and Sugar Camp (right)

Potential Development Costs to Provide Public Fuel Sales

While public gasoline sales at Mount Carleton Provincial Park is not recommended at this time, it may become desirable, and would likely become more necessary, if winter overnight lodging for the public is added in the Park in the future (perhaps in a potential Phase 2 of winter development). With snowmobilers staying within the park, the snowmobile trail network would transform into a more significant activity hub versus initially being a pass-thru to other overnight lodging destinations. Thus it may be logical to consider packaging future public gasoline sales with future overnight lodging within a winter park concessions contract, should this scenario eventually be pursued by the Department.

Public fuel sales would require establishing a sales location at Mount Carleton. The easiest short-term option may be to use the existing park headquarters fuel depot shown in Photo 37. While the existing gasoline tank and pump is likely sufficient for initial fuel sales, a heated building for the gas attendant to work from would be required. The small storage building shown to the right of the fuel tanks may be able to be converted for this use, although total costs, potential space and

Photo 37: Existing Mt. Carleton fuel depot area

regulatory requirements, heat source potential, etc. are currently unknown and will require more investigation. If this building proves to be unsuitable, other nearby park building may provide additional options. While this location may initially be the easiest, it is debatable whether funneling a high volume of public snowmobile traffic through the park headquarters and shop area is desirable for overall long-term park operations. Consequently it may prove to be more desirable to package public fuel sales with potential park store/gas sales and a check-in office for an overnight lodging concession operation elsewhere in the Park.

It may be desirable to upgrade all existing park fuel sources (diesel tank for groomers and gasoline tank for snowmobile fuel sales) at the point in time public fuel sales are initiated at park headquarters. Table 36 shows the estimated cost to upgrade two fuel tanks ranges from $39,300 to $51,700 depending upon whether 4,500 liter or 9,100 liter fuel tanks are installed.

Table 36: Potential Cost to Upgrade Fuel Supply Infrastructure

Item	Item Cost
Option #1: 2 – 4,500 liter double steel wall tanks with hardware & pumps installed, plus removal of 2 existing single tanks	$39,300
Option #2: 2 – 9,100 liter double steel wall tanks with hardware & pumps installed, plus removal of 2 existing single wall tanks	$51,700

Potential Operating Costs to Provide Park Fuel Sales

If public fuel sales are initiated at park headquarters, it could likely be accomplished with one seasonal employee working no more than 40 hours per week spread out over five peak use days (perhaps Wednesday through Sunday or Thursday through Monday). As shown in Table 35 on page 36, snowmobilers have multiple fueling options available to them across the Northern Odyssey region. This means trail riders generally will not *have to* purchase fuel when passing through Mount Carleton; rather it would most often be a discretionary purchase. The most likely riders to purchase fuel at Mount Carleton would be those who make it a practice to 'top off their tanks' every opportunity they have (and consequently purchase only a small quantity of fuel), or those who spend time exploring ungroomed roads off-trail and consume more fuel than if simply trail riding.

Since there is currently no overnight lodging available in Mount Carleton Provincial Park snowmobilers will be traveling from home or their overnight lodging location prior to reaching the park. Consequently they should be starting their day with a full tank of fuel, meaning early morning fuel sales at Mount Carleton is not likely currently necessary. Likewise with there being no overnight accommodations at Mount Carleton, riders would typically be headed toward home or their overnight accommodations by late afternoon. Consequently the most logical window of time for park fuel sales is likely between 10 AM until no later than 4 to 6 PM (maximum of 6 to 8 hours per day).

If one seasonal employee were paid $20 per hour to operate the fuel station, their daily salary would cost $120 for six hours of fuel sales or up to $160 for eight hours of work ($600 to $800 per week in total gas attendant labor costs). Consequently a maximum labor cost of $160 per day is used to calculate potential net fuel sales income in Table 37 below.

Since the average snowmobile fuel capacity is about 37.8 liters, fuel sales at Mount Carleton would likely range from those buying 10 liters as they top off their tanks when passing through, to those buying around 20 liters since their tank is about half-full, to those who will buy around 30 liters since they have been playing on ungroomed area roads and are nearly empty. Consequently an average of 20 liters per snowmobile is used to calculate potential fuel sales income in Table 37 below.

The average fuel price at area on-trail lodges and resorts during the 2012-2013 winter season was approximately $1.80 per liter of gasoline. The Department has indicated that, if they initiate public fuel

sales, their intent would not be to compete with private businesses but rather to provide gas solely as a service to snowmobilers to help increase area snowmobile tourism; consequently they would charge at least five cents per liter more than area businesses as a non-competitive disincentive. Since the Department's current wholesale gasoline cost is $1.09 per liter, a 'per liter sales markup' of 76 cents ($1.85/L sales price minus $1.09/L purchase price) is used to calculate potential fuel sales 'gross profit income before operating expenses' in Table 37.

Table 37 shows a potential range of 'daily profit' from fuel sales. This 'profit' subtracts the daily labor cost for one fuel attendant, but does not include any other fuel sales delivery costs such as heat/utility cost for the attendant building or any direct or capitalized infrastructure development/improvement costs.

Table 37: Snowmobile Fuel Sales – Potential Daily Profit (does not include attendant building heat/utilities or other infrastructure costs)

Fuel Sales Profit Factor	Range of Potential Number of Daily Fuel Sales									
	10	**15**	**25**	**50**	**75**	**100**	**125**	**150**	**175**	**200**
Daily Income: from average 20 L sold X $0.79/L = $15.80	$158	$237	$395	$790	$1,185	$1,580	$1,975	$2,370	$2,765	$3,160
Daily Labor Expense: 1 gas attendant @ 8 hours/day X $20/hour = $160.00	$160	$160	$160	$160	$160	$160	$160	$160	$160	$160
Potential Daily Profit	($2)	$77	$235	$630	$1,025	$1,420	$1,815	$2,210	$2,605	$3,000

Since there is no track record for potential Mount Carleton fuel sales, the number of potential weekly fuel sales is difficult to project. The most likely scenario is that the 'average number of daily fuel sales' could vary widely based upon day of week as well as time of season. Saturday and Sunday may perhaps hit the 'middle to upper ends' of Table 37's daily projections, while all other days would likely be more toward the 'middle to lowest end' of potential numbers. Consequently a 'peak week' could potentially have a total of 250 to 500 total sales ($3,350 to $7,300 weekly profit after $600 labor cost), while less busy weeks may draw only 125 to 300 total fuel sales ($1,375 to $4,140 weekly profit after $600 labor cost).

Long-Term Equipment Replacement and Infrastructure Needs

Trail Grooming Equipment Replacement Cycle

The example grooming schedules summarized in Table 27 show Mount Carleton based grooming tractors could potentially be used 1,200 to 1,400 hours per year (dependent upon all proposed new trails being added and adequate snow conditions). While this is heavy use compared to other New Brunswick grooming operations (Nepisiguit Sport Lodge currently has top 5-year seasonal average in the province with 907 hours, followed by Club Motoneige Chaleur at 769 hours), it maximizes use of this costly specialized equipment and saves money over the long-term when compared to buying additional grooming units at a cost of $236,000 each. While a 'grooming unit' consists of a tractor and a drag, only the tractor needs to be routinely replaced since grooming drags will easily last 10 to 20 years if properly maintained.

An equipment replacement cycle of three to five years is recommended to help keep grooming tractors fresh with lower annual repair and operating costs. While some areas often utilize tractors longer than three to five years, they can become less dependable as they accumulate high hours. This can ultimately lead to significant deterioration of trail conditions due to lost grooming repetitions if equipment is frequently broke-down. In the end snowmobile riders become upset with rough trails and tourism suffers.

A good maintenance program helps extend equipment life as well as attain good trade-in values when grooming tractors are upgraded. An Example Sno-Cat Maintenance Schedule and Snow Cat Service Sheet are provided in Appendix 7 and 8. While these examples were developed for Tucker Sno-Cat models, they can be easily adapted to any brand of grooming tractors. When used in combination with tractor manufacturer owner's and service manuals, they can help provide a high quality maintenance program to enhance equipment dependability and longevity.

The State of Wyoming Trails Program owns a fleet of eleven Tucker Sno-Cats it operates on their smaller snowmobile trail systems, while the larger, high use systems are mostly groomed by private contractors. Wyoming has detailed records of their state-owned grooming equipment which provides a good snapshot of grooming equipment depreciation costs. Since 2005 Wyoming has traded-in a total of 16 Sno-Cats whose model years ranged from 1998 through 2008. Six of these tractors were originally purchased as new units and the other ten were originally purchased as one- or two-year old 'used' units. While 'used tractors' were purchased along with new to initially help build the Wyoming grooming fleet, only new tractors have been purchased the past three years to help ensure the fleet is as 'fresh' and dependable as possible.

Four of the six 'new' tractors were used five years before being traded with annual usage ranging from 457 to 576 hours per season during their service. Purchase price less trade value divided by total hours of service during Wyoming ownership shows an actual depreciation rate of $26.52 to $29.80 (USD) per hour of use for these new tractors used for five years. The other two 'new' tractors were used for a total of nine and ten years with annual usage averaging 326 and 231 hours respectively. The actual depreciation averaged $23.86 per hour for the '9 year' Cat and $30.46 per hour for the '10 year' Cat. Overall these six 'purchased new' Cats experienced an hourly depreciation rate of $27.55.

The ten 'purchased used' tractors were all used for three to five years before being traded-in, and average annual use during Wyoming ownership varied widely – from only 127 hours per year up to 783 hours per year for each of these used Cats. The Cat with only 127 hours of average annual use had the highest depreciation rate of all 16 vehicles at $62.83 per hour, while the Cat with 783 hours of average annual use experienced a depreciation rate of $31.86 per hour. Depreciation rates for the other 'used' tractors ranged from $25.61to $50.45 per hour. Overall these ten 'purchased used' Cats experienced an hourly depreciation rate of $37.07.

When looking at all 16 Wyoming Cats traded-in since 2005, they averaged 4.75 'Years Used,' 1,789 'Total Hours Used' during Wyoming ownership, 403 'Average Hours per Year,' and an Average Depreciation Rate of $33.50 per hour. When three Sno-Cats which were used less than 180 hours per year are removed from the equation, the remaining 13 Cats averaged 4.92 'Years Used,' 2,056 'Total Hours Used' during Wyoming ownership, 461 'Average Hours per Year,' and an Average Depreciation Rate of $29.10 per hour. This Wyoming data shows that, generally, the less you use a snow grooming tractor the higher your hourly depreciation rate will be, and if you keep a tractor in your fleet too long its trade-value diminishes since it no longer competes well with technological advances.

Table 26 shows the estimated cost of new snowmobile trail grooming units is $236,000. Approximately $16,000 of this unit cost is attributed to the trail grooming drag with the remaining $220,000 being the cost of the trail grooming tractor. Only the tractor will require regular updating every three to five years, dependent upon actual annual use patterns.

Table 38 below presumes an average $30.00 per hour depreciation rate to calculate a range of grooming equipment replacement costs predicated on a tractor being used between two and five years before being replaced. A range of 900, 1,200, and 1,400 hours of grooming use per year was used for the calculations based upon estimated maximum annual grooming hours for Mount Carleton-based equipment and the current top average annual club grooming hours. Since Park-groomed tractor hours would be fairly high,

a maximum 3-year use cycle before trading would mostly likely best capture good trade values while also keeping annual operating costs lower and ultimately providing the best tractor dependability.

Table 38: Range of Potential Grooming Tractor Trade-In Values

New Tractor Purchase Price	# of Years Used	Average Hours per Year	Total Hours at Trade-In	Total Depreciation @ $30/hour	Tractor Trade Value $	% of Original Purchase Price
$220,000	2	900	1,800	54,000	166,000	75.5
	2	1,200	2,400	72,000	148,000	67.7
	2	1,400	2,800	84,000	136,000	61.8
	3	900	2,700	81,000	139,000	63.2
	3	1,200	3,600	108,000	112,000	50.9
	3	1,400	4,200	126,000	94,000	42.7
	4	900	3,600	108,000	112,000	50.9
	4	1,200	4,800	144,000	76,000	34.5
	4	1,400	5,600	168,000	52,000	23.6
	5	900	4,500	135,000	85,000	38.6
	5	1,200	6,000	180,000	40,000	18.2
	5	1,400	7,000	210,000	10,000	4.5

Table 39 presumes a 5% annual increase in grooming tractor prices and calculates an example range of potential trade costs based upon a two- to five-year equipment replacement cycle when the tractor used as the trade-in was used an average 1,200 hours per grooming season. In this high-use scenario, a replacement cycle of every two to three years is clearly more advantageous than keeping a tractor for four to five years since trade price climbs while annual operating costs would also likely be increasing substantially on high-hour tractors during years four and five.

Table 39: Range of Potential Replacement Cycle Grooming Tractor Trade Prices

Replacement Tractor Purchase Price, with 5% annual price increase	Replacement Cycle	Trade-In Value @ 1,200 Hours per Year Average	Purchase Price With Trade-In
$242,550	2 years	$148,000	$94,550
$254,680	3 years	$112,000	$142,680
$267,415	4 years	$76,00	$191,415
$280,785	5 years	$40,000	$240,785

Potential Winter Parking Needs

Additional winter parking may need to be provided at Mount Carleton Provincial Park, on-trail businesses, or new sites at the center of the Northern Odyssey region in order to maximize snowmobile tourism growth. This could be particularly important at the beginning of the snowmobile season in December as well as near the end from late March through April or later, when poor snow conditions on the outer fringes of the region may prevent snowmobilers from riding directly from their homes or hotels in communities around the outside perimeter. In this situation they can often still ride, but would need to haul their snowmobiles further into the center of the region to reach the Snowbelt.

Winter parking for snowmobilers requires a suitable site (open, cleared of rocks and stumps, and relatively flat) along a plowed road that is also close or adjacent to the snowmobile trail system. While a hardened or graveled surface is desirable, snowmobile parking is often successfully provided on frozen sod. Snow removal must be supplied at the parking lot to ensure dependable parking access is available for trucks and trailers, with ample room for unloading and maneuvering long rigs being required.

Limited parking for snowmobilers is currently available in the center of region at the Mount Carleton park entrance, as well as at a few on-trail businesses including Sugar Camp, Rogers Lake and Governors Wilderness Resort. It would be advantageous to develop additional winter parking at these interior locations to promote more shoulder-season snowmobile tourism. Other sites along plowed roadways should also be investigated for potential new parking development at strategic locations near the center of Northern Odyssey. Snow removal may be able to be provided with the trail grooming tractor's front blade. Otherwise partnerships or contracts for snow removal may be required.

Photo 38: Winter parking at Mt. Carleton entrance

For comparative purposes, numerous snowmobile parking areas have been developed outside communities in the Black Hills. These parking areas are strategically located at road/trail intersections, as well as sometimes at a trail shelter or nearby an on-trail business. This model has proven to help build snowmobiling access since snowmobile trails do not go into many of the Black Hills communities.

Photo 39: Example of winter parking in the Black Hills

Another successful model from the Black Hills is that several on-trail businesses provide rental spaces for snowmobilers to park their trailers all winter long. This gives riders an 'operations base' for the winter and allows them to travel back and forth from home without having to tow their snowmobiles. Some businesses have taken storage rental to the next level by building inside storage units where snowmobilers store their sleds year-round. Both examples provide additional income for on-trail snowmobile businesses.

Photo 40: Example of snowmobile storage units and trailer parking at Trailshead Lodge in the Black Hills

Potential Overnight Accommodations at Mount Carleton

There is potential to provide overnight winter accommodations at Mount Carleton Provincial Park for snowmobilers and other winter visitors. The eight Heritage Cabins (six camps) on Nictau Lake can accommodate a maximum of 35 people and likely provide the best potential for initial overnight winter rental since they are located closest to park headquarters. If winter lodging rental is successful, there could also be potential to add five more cabins at Bathurst Lake that can accommodate up to 34 people.

Photo 41: Spruce Camp at Nictau Lake

Winter access to these cabins would be limited to only those traveling by snowmobile, skis, or snowshoes since plowed road access to the camps is not available during winter. Likewise, all park staff would require snowmobile access for maintenance, cleaning, security, and other duties.

Potential Challenges: Winter rental of the Mount Carleton Park cabins would not be without obstacles. An investment in infrastructure by the Department or a concessionaire would be required prior to initiating any winter cabin rental program at Mount Carleton. The potential costs for infrastructure development are undetermined and outside the scope of this project, but at a minimum must address:

1. None of the Park's cabins, central kitchen, or central shower faculty is currently 'winterized.' This will require a varying degree of water line work along with insulating the various facilities. Winterization efforts will potentially be complicated by the fact all camp buildings are heated solely by wood stoves – making winter-long 24/7 heat to prevent waterline freeze-up questionable or at least burdensome.

2. The Park currently does not provide essential items overnight visitors would generally expect if staying in a hotel or lodge setting. Specifically, summer visitors who rent these cabins are advised to bring their own 'air mattress, sleeping bag, pillow, drinking water, food, dishes, utensils, dish soap, towels, and a cooler.' This would be a major obstacle and detriment to winter rental since hauling air mattresses, bedding, dishes, etc. would be difficult to impossible for snowmobilers and skiers.

Photo 42: Bunk bed in Nictau Lake cabin

3. The Park would need to add winter staff to specifically accommodate guest check-in/check-out, facility cleaning and maintenance, security, maintaining wood heat sources in each building, etc. This could easily require two to four or more seasonal employees in order to cover all needs seven days a week for the eight cabins. Two to four employees at $20 per hour would potentially cost $1,600 to $3,200 per week to staff this cabin rental operation. It is possible cabin rentals could be operated at a lower cost through a concessions operation than if operated by the Park.

Additional snowmobiles, tow sleds, and other equipment would also likely need to be added so park staff can reach Nictau Camps from park headquarters and to help staff perform their expanded winter job functions. Since all buildings are heated by wood, a significant firewood supply would be required to operate all camp buildings for an entire winter season.

Potential Cabin Rental Income: Table 40 shows the various accommodations available at the Nictau Camps along with maximum occupancy capacity. A range of potential revenue from nightly rentals is calculated to range from a minimum of $540 per night income if all cabins have 'double occupancy' up to a maximum of $770 per night if all cabins were fully occupied. While these projections are based upon current summer season rental rates, it is likely winter rates may need to be higher to off-set the cost of additional cabin amenities, more firewood for heat, and potentially higher service costs for overall winter versus summer cabin operations.

The 2009 Snowmobile Study indicates the 'average resident and non-resident snowmobile group size' for an overnight trip is 3.0 for residents and 4.5 for non-residents. Consequently for the purposes of calculating potential average nightly income rates, the three camps whose maximum occupancy is two or three people (Pine, Cedar and Fir) were presumed to achieve their maximum nightly rental rate ($90 or $100 per night) at all times. The remaining camps (Spruce, Maple and Ash) were presumed to have an average nightly rental rate of $120 based upon achieving an average occupancy of five people per night.

Table 40: Nictau Cabins – capacity and potential nightly revenue

Nictau Cabins	**Camp Accommodations** (all cabins have a kitchen)	**Total Beds**	**Maximum Capacity (persons)**	**Minimum Nightly Rate (double occupancy)**	**Maximum Nightly Rate (+ $10 pp)**	**Average Nightly Rate (average 2009 group size)**
Spruce Camp	4 single bunk beds (8) in main cabin & 2 small cabins/ 1 double bed each	10	12	$90	$190	$120
Pine Camp	1 double bed	1	2	$90	$90	$90
Cedar Camp	1 double bottom bunk/ 1 single top bunk	2	3	$90	$100	$100
Maple Camp	3 single bunk beds (6) & 1 double bottom bunk/ 1 single top bunk	8	9	$90	$160	$120
Fir Camp	1 double bottom bunk/ single top bunk	2	3	$90	$100	$100
Ash Camp	2 double bottom bunks/ single top bunk	4	6	$90	$130	$120
Total Nightly Rental Revenue		27	35	$540	$770	**$650**

The Mount Carleton cabins would have a potential winter operating season from late November/early December through mid-to late April, providing approximately 140 potential cabin rental nights over 20 weeks. Table 41 below estimates the range of potential weekly and winter season-long rental income, based upon an average $650 per night income from all six camps.

Winter lodging occupancy rates in the overall Northern Odyssey region have averaged 31% to 33% the past few years. Table 41 shows the full range of potential weekly and season-long revenue, from a low of 10% average overall occupancy all the way up to the unlikely scenario all cabins were rented 100% every night for a full 20 week season. If the Mount Carleton cabins averaged 30% occupancy similar to the

regional average, $1,365 per week and $27,300 per season would be generated. If the cabins could achieve 50% average occupancy revenue would increase to an average of $2,275 per week and $45,500 for a complete winter season.

The 'average weekly revenue' is an important factor since it can be used to easily compare potential operating costs for labor, supplies, etc. against potential income generation from those efforts. For instance if two employees were hired at $20 per hour and 40 hours per week, their salary costs alone would total $1,600 per week and require a 35% occupancy rate to break even. If four employees were hired it would cost $3,200 per week for just salary, requiring a 70% occupancy rate to just pay employee costs. Supplies and other operating costs would be above and beyond labor costs, so the example occupancy rates required to cover just labor costs understate the occupancy rate required if the goal is for winter cabin rental to be a profit center.

Table 41: Nictau Cabins – range of potential weekly and seasonal cabin rental revenue

Nictau Cabins	Total Winter Room Nights (% of 140)	Average Total Winter Season Revenue $ (room nights X $650/night)	Average Weekly Revenue $ (20 weeks)
10% Average Occupancy	14	9,100	455
15% Average Occupancy	21	13,650	682.50
20% Average Occupancy	28	18,200	910
25% Average Occupancy	35	22,750	1,137.50
30% Average Occupancy	42	27,300	1,365
35% Average Occupancy	49	31,850	1,592.50
40% Average Occupancy	56	36,400	1,820
45% Average Occupancy	63	40,950	2,047.50
50% Average Occupancy	70	45,500	2,275
55% Average Occupancy	77	50,050	2,502.50
60% Average Occupancy	84	54,600	2,730
65% Average Occupancy	91	59,150	2,957.50
70% Average Occupancy	98	63,700	3,185
75% Average Occupancy	105	68,250	3,412.50
80% Average Occupancy	112	72,800	3,640
85% Average Occupancy	119	77,350	3,867.50
90% Average Occupancy	126	81,900	4,095
95% Average Occupancy	133	86,450	4,322.50
100% Average Occupancy	140	91,000	4,550

Additional analysis should be conducted to better understand the full development costs, as well as all potential operating costs, before a winter cabin rental program is established at Mount Carleton Provincial Park. At a minimum this analysis should, in addition to issues and topics identified above, also consider the following:

1. The appropriateness of a higher winter season rental fee for Park cabins.

2. The potential for a concessionaire to operate a winter cabin rental program since they may be able to operate at a lower cost due to more flexibility with labor rates than what government has. A concessionaire could also potentially bring experience and economy of scale to the program that may ultimately help reduce operating costs.

SUMMARY OF COSTS

One-Time Development Costs

Table 42 shows that the *maximum* estimated cost to add all 343 kilometers of proposed new snowmobile trail routes, five new trail shelters, and two trail grooming units for a new grooming base at Mount Carleton Provincial Park is slightly more than $1 million. Since this would be dependent upon all new trail routes being approved, total development costs could likely be less than $1 million.

Table 42: Summary of Total Potential *Maximum* Trail Infrastructure and Equipment Costs

Trail Development Item	Total Cost $
Trail Bridges	447,308
Trail Signing	72,283
Trail Clearing and Improvement	13,660
Trail Shelters	51,920
Trail Grooming Unit: Tractor #1 with 9' grooming drag	236,000
Trail Grooming Unit: Tractor #2 with 9' grooming drag	236,000
Total *Maximum* Potential Development Costs:	1,057,171

If desired, development costs could potentially be phased in over two years as broken out in Tables 43, 44, and 45. Table 43 outlines the minimum of what would be required in Year 1to establish a grooming base at Mount Carleton with an initial investment of $487,372. This would require two of the four proposed bridges being installed, 16 kilometers of new snowmobile trail through the Park being brushed, minimal trail signing in and around the Park, and the purchase of one trail grooming unit.

Table 43: Summary of Total *Minimum* Year 1 Costs to establish a Mount Carleton grooming base

Trail Development Item	Total Cost $
Trail Bridge #2: Bathurst Lake Camps (36.5 m)	158,063
Trail Bridge #3: Moose Creek (18.25 m)	68,894
PSS intersection signs: 1 @ $973	973
New trail signing: 16 km @ $102/km	1,632
Supplemental trail signing on existing routes: 330 km @ $57/km	18,810
New trail route on 16 km of road thru Mount Carleton Park	1,200
Mount Carleton summit access trail improvement	1,800
Existing Armstrong trail shelter at Mount Carleton Park	0
Trail Grooming Unit: Tractor #1 with 9' grooming drag	236,000
Total *Minimum* Year 1 Development Costs:	487,372

While it would be desirable to accomplish all development at one time during Year 1, Table 44 outlines $467,011 of development costs which could potentially be deferred to Year 2. This remaining development work would include installation of the other two park bridges, constructing the trail reroute off the park entrance road and Highway 385, and purchasing a second trail grooming unit.

Table 44: Summary of Year 2 Costs to establish a Mount Carleton Park grooming base (if phased)

Trail Development Item	Total Cost $
Bridge #1: Armstrong Brook (43 m)	202,410
Bridge #4: Smith Road – replace deck and rails	17,941
Trail re-route off plowed roads near Mount Carleton Park entrance	10,660
Trail Grooming Unit: Tractor #2 with 9' grooming drag	236,000
Total Year 2 Development Costs (if phased):	467,011

The final development piece which could likely be spread over multiple years is the addition of 327 kilometers of new snowmobile trails on DNR roads outside Mount Carleton Park. Since this is dependent upon approval by DNR, it is possible this could take more than one year to fully accomplish. There is also a possibility some of the proposed trail routes may not receive DNR approval.

If all new trail routes are not approved, fewer intersection and trail signs will be required. It is also possible fewer new trail shelters would be required if all proposed new trail loops are not approved. Table 45 shows the estimated cost is $102,788 to add all proposed new snowmobile trails and shelters outside Mount Carleton Park. If all new routes are not approved, total development costs could be substantially less than $102,788.

Table 45: Summary of potential new trail development costs outside Mt. Carleton Park (if phased)

Trail Development Item	Total Cost $
New snowmobile trail routes on 327 km of DNR roads	0
PSS intersection signs: up to 18 @ $973 each	17,514
New trail signing: up to 327 km @ $102/km	33,354
New shelters along new trail segments: up to 4 @ $12,980 each	51,920
Potential New Trail Development Costs (if phased):	102,788

While Mount Carleton Provincial Park camps pose great potential for winter lodging opportunities which would be attractive to snowmobilers, potential development and operating costs for winter lodging are deferred to a future concessions analysis if the Park decides to further investigate this opportunity.

Annual Operating Costs

Annual operating costs outlined in this plan relate only to the direct operation of a snowmobile trail grooming base at Mount Carleton Provincial Park. Winter costs to staff and operate Mount Carleton Provincial Park outside of snowmobile trail grooming operations are not included. These costs would be different for a '1-tractor' grooming scenario versus a '2-tractor' grooming scenario as summarized below.

Table 46 shows the total annual operating costs for a '1-tractor' grooming scenario based at Mount Carleton would be about $77,000.

Table 46: Summary of Annual Operating Costs for a '1-tractor' grooming scenario

Operating Cost Item	Total Cost $
1 Tractor Operating Costs: fuel, repairs, service; 1,271 hours @ $35/hour	44,485
2 Groomer Operators: 18 weeks @ $20/hour	28,800
1 Groomer Operator: lodging & meals, 2 nights per week @ Serpentine Lodge	3,600
Total Annual Operating Costs:	76,885

Table 47 shows the total annual operating costs for a '2-tractor' grooming scenario based at Mount Carleton would be about $154,000. This is the estimated potential *maximum* annual cost based upon all proposed new snowmobile trail routes in the Mount Carleton area being approved by DNR; this annual operating cost will be less if all new trail routes are not approved.

Table 47: Summary of Annual Operating Costs for a '2-tractor' grooming scenario

Operating Cost Item	Total Cost $
2 Tractors Operating Costs: fuel, repairs, service; 2,662 hours @ $35/hour	93,170
4 Groomer Operators: 18 weeks @ $20/hour	57,600
1 Groomer Operator: lodging & meals, 2 nights per week @ Serpentine Lodge	3,600
Total Annual Operating Costs:	154,370

Capital Equipment Replacement Costs

It is recommended that Mount Carleton-based snowmobile trail grooming tractors be replaced once every two to three years. A 'once every three years' maximum replacement cycle would be acceptable if the only '1-tractor'scenario is adopted. This would cost approximately $143,000 once every three years, or an annualized cost of about $47,700.

If the '2-tractor' scenario is adopted: it is recommended one tractor initially be replaced in Year 2, the second tractor be replaced in Year 3, and then each tractor subsequently follow a 'once every three years' maximum replacement cycle thereafter. Using Tractor Replacement Prices calculated in Table 39 and summarized in Table 48, approximately $95,000 would be required in Year 2, $143,000 in Year 3, $143,000 (plus inflation) in Years 5 and 6, 8 and 9, etc. This would cost approximately $143,000 two out of every three years after the initial two- and three-year cycle was completed, or an annualized cost of about $95,300.

Table 48: Summary of Equipment Replacement Cost Scenarios

Equipment Replacement Costs	Frequency	Cost $
Trail Grooming Tractor with trade-in	1 per 2 years	94,550
or		
Trail Grooming Tractor with trade-in	1 per 3 years	142,680

Summary of Maximum and Minimum Potential Project Costs

Total estimated potential maximum costs to implement a '2-tractor' grooming base at Mount Carleton Provincial Park and add 343 kilometers of new snowmobile trail in the Mount Carleton and Christmas Mountains area total about $250,000 per year as outlined in Table 49.

Table 49: Summary of Total Potential *Maximum* Project Costs

Cost Item	Total Cost $
One-Time Development Costs	1,057,171
Direct Annual Operating Costs – '2 tractor' scenario / 4 operators	154,370
Equipment Replacement Costs – 2-tractor' scenario / 3-year cycle; annualized cost to trade 1 every 2 out of 3 years	95,300
Total Annualized Operating Costs	249,670

Total estimated minimum costs could be less if no new trails are approved outside Mount Carleton Provincial Park and only one trail groomer is operated. Annualized operating costs would be about $125,000 as summarized in Table 50.

Table 50: Summary of Total Potential *Minimum* Project Costs

Cost Item	Total Cost $
One-Time Development Costs	954,383
Direct Annual Operating Costs – '1 tractor' scenario / 2 operators	76,885
Equipment Replacement Costs – '1-tractor' scenario / 3-year cycle; annualized cost to trade 1 out of 3 years	47,700
Total Annualized Operating Costs	124,585

POTENTIAL ECONOMIC IMPACTS

This Snowmobile Trails Development Plan is built on the premise that the 'snowmobile tourism season' in the Northern Odyssey Region and particularly the Mount Carleton and Christmas Mountains areas could be extended by four to six weeks with the addition of a snowmobile trails grooming base at Mount Carleton Provincial Park. This plan would increase trail grooming efforts in the Mount Carleton area to an average of 18 weeks compared to an existing average of only 11 to 12 weeks in the center of Northern Odyssey by club volunteers. It would also add snowmobile trails in the area to improve trail grooming efficiencies and increase snowmobiling opportunities. While this will require a front-end investment of about $1 million along with annual operating costs of $77,000 to $154,000 to support trail grooming operations, a lengthened snowmobiling season would potentially generate additional winter tourism and economic impacts as follows:

Table 51 estimates a range of potential increased visitor spending that could result from a four-week longer snowmobiling season. Potential expenditures are based upon 2008-2009 New Brunswick Snowmobile Tourism Economic Study data with 'average trip expenditures' indexed from 2009 to 2012 dollar values. An additional $266,000 in snowmobile visitor spending would be generated if only 100 additional snowmobile trips (average of only 25 more per week) result from the longer season whereas over $2.6 million in additional visitor spending would result from 1,000 additional snowmobiling trips (250 more per week average) in the region over the long term. This increased snowmobile spending could potentially generate more than $300,000 per year in additional provincial tax revenue while creating up to 51 new jobs.

Table 51: Potential Increased Annual Snowmobile Visitor Spending, Provincial Tax Revenue and Full-Time Jobs – based upon potential increased trips resulting from a 4-WEEK INCREASE in extended snowmobile season (based upon 2009 survey dollars indexed to 2012 dollar values)

Group Trip Type and Average $ Spent per Trip	Potential Increased Snowmobile Visitor Spending if 'Snowmobile Trips' Increase by '# of additional trips' per year in Northern Odyssey Region – based upon adding 4 WEEKS to the season with increased trail grooming				
	+ 100 trips (25/week)	+ 250 trips (62.5/week)	+ 500 trips (125/week)	+ 750 trips (187.5/week)	+ 1,000 trips (250/week)
Resident Same Day: $153.90/trip	$15,390	$38,475	$76,950	$115,425	$153,900
Resident Overnight: $679.37/trip	$67,937	$169,843	$339,685	$509,528	$679,370
Non-Resident All: $1,827.66/trip	$182,766	$456,915	$913,830	$1,370,745	$1,827,660
Total Potential Spending Increase:	**$266,093**	**$665,233**	**$1,330,465**	**$1,995,698**	**$2,660,930**
Potential Tax Revenue Increase	$30,276	$75,691	$151,382	$227,187	$302,764
Potential New Full-Time Jobs Increase	5.17	12.92	25.84	38.78	51.69

Table 52 estimates a range of potential increased visitor spending that could result from a five-week longer snowmobiling season. An additional $333,000 in snowmobile visitor spending could be generated if only 125 additional snowmobile trips (average of only 25 more a week) result from the longer season whereas over $3.3 million in additional visitor spending would result from 1,250 additional snowmobiling trips (an average of 250 more per week) in the region over the long term. This increased snowmobile spending could potentially generate up to $345,000 per year in additional provincial tax revenue while creating up to 59 new jobs.

Table 52: Potential Increased Annual Snowmobile Visitor Spending, Provincial Tax Revenue and Full-Time Jobs – based upon potential increased trips resulting from a 5-WEEK INCREASE in extended snowmobile season (based upon 2009 survey dollars indexed to 2012 dollar values)

Group Trip Type and Average $ Spent per Trip	Potential Increased Snowmobile Visitor Spending if 'Snowmobile Trips' Increase by '# of additional trips' per year in Northern Odyssey Region – based upon adding 5 WEEKS to the season with increased trail grooming				
	+ 125 trips (25/week)	+ 300 trips (60/week)	+ 625 trips (125/week)	+ 950 trips (190/week)	+ 1,250 trips (250/week)
Resident Same Day: $153.90/trip	$19,238	$46,170	$96,188	$146,205	$192,375
Resident Overnight: $679.37/trip	$84,921	$203,811	$424,606	$645,402	$849,213
Non-Resident All: $1,827.66/trip	$228,458	$548,298	$1,142,288	$1,736,277	$2,284,575
Total Potential Spending Increase:	**$332,617**	**$798,279**	**$1,663,082**	**$2,527,884**	**$3,326,163**
Potential Tax Revenue Increase	$37,859	$90,861	$189,294	$258,587	$344,609
Potential New Full-Time Jobs Increase	6.46	15.51	32.32	44.14	58.83

Table 53 estimates a range of potential increased visitor spending that could result from a six-week longer snowmobiling season. An additional $399,000 in snowmobile visitor spending would be generated if only 150 additional snowmobile trips (25 per week) result from the longer season whereas almost $4 million in additional visitor spending would result from 1,250 additional snowmobiling trips (250 per week average) in the region over the long term. This increased snowmobile spending could potentially generate up to $454,000 per year in additional provincial tax revenue while creating up to 78 new jobs.

Table 53: Potential Increased Annual Snowmobile Visitor Spending, Provincial Tax Revenue and Full-Time Jobs – based upon potential increased trips resulting from a 6-WEEK INCREASE in extended snowmobile season (based upon 2009 survey dollars indexed to 2012 dollar values)

Group Trip Type and Average $ Spent per Trip	Potential Increased Snowmobile Visitor Spending if 'Snowmobile Trips' Increase by '# of additional trips' per year in Northern Odyssey Region – based upon adding 6 WEEKS to the season with increased trail grooming				
	+ 150 trips (25/week)	+ 375 trips (62.5/week)	+ 750 trips (125/week)	+ 1,125 trips (187.5/week)	+ 1,500 trips (250/week)
Resident Same Day: $153.90/trip	$23,085	$57,713	$115,425	$173,138	$230,850
Resident Overnight: $679.37/trip	$101,906	$254,764	$509,528	$764,291	$1,019,055
Non-Resident All: $1,827.66/trip	$274,149	$685,373	$1,370,745	$2,056,118	$2,741,490
Total Potential Spending Increase:	**$399,140**	**$997,850**	**$1,995,698**	**$2,993,547**	**$3,991,395**
Potential Tax Revenue Increase	$45,431	$113,576	$227,153	$340,729	$454,305
Potential New Full-Time Jobs Increase	7.76	19.39	38.78	58.17	77.56

It should be relatively easy to generate an average of at least 60 to 125 additional trips per week across the region as the result of expanded trail grooming efforts and additional snowmobile trail opportunities in the Mount Carleton area. It should be reasonably feasible that 750 to more than 1,000 additional trips per

season (weekly average of 190 or more per week) could be realized through this expanded effort to attract snowmobile tourism as the new trails and grooming becomes established and subsequently promoted through Northern Odyssey marketing efforts.

Using mid-range projections (Table 52) shows additional snowmobile visitor spending of $800,000 to over $2.5 million per year could potentially be generated through these efforts. This new tourism spending would generate between $91,000 to over $258,000 per year in additional provincial tax revenue and create the equivalent of at least 15 and potentially more than 44 new full-time jobs in the area. The added snowmobile tourism spending will help grow the local economy while helping cover expanded annual grooming costs through the added provincial tax revenues which would be generated.

ACKNOWLEDGEMENTS

This operations and business plan was developed by Kim Raap, owner of Trails Work Consulting (Trails Work), in consultation with the New Brunswick Federation of Snowmobile Clubs, Inc. (Federation) and the New Brunswick Department of Tourism, Heritage and Culture (Department). Mr. Raap has 35 years experience developing and managing snowmobile trail systems and has provided consulting services to snowmobile trail managers across the United States and Canada since 2004.

This project reviewed and analyzed a wide range of information provided by the Federation and Department. A special thank you goes out to the many individuals within the Federation and Department who assisted with these efforts.

An extremely important piece of the review included an on-site visit to the Northern Odyssey Region and Mount Carleton Provincial Park January 10-13, 2013 by Kim Raap from Trails Work, Ross Antworth and Kyle Good from the Federation, and Carl Lavigne from the Department. The group traveled a total of 750 kilometers via snowmobile over these four days, departing from and returning to Bathurst with overnight stays at Popple Depot, Riley Brook, and St. Quentin during the trip.

A very special thank you to the following groups and individuals who took time to share thoughts and answer questions during this tour of the project area: the Bathurst tourism and snowmobiling group, Gerald (Doodles) Drysdale at Rogers Lake, Mark MacLellan at Governors Wilderness Resort, Don McAskill at Bear's Lair, Alyre Marquis at Serpentine Lodge, and Michel Landry and Yvette Theriault at Auberge Sugar Camp. Additionally many individuals and groups were encountered along the trail, at warming shelters, or in snowmobile club houses that provided valuable insights and perspectives. Most importantly the detailed tour, important insights, and assistance with a spare snowmobile provided by Mount Carleton Provincial Park Manager Louis Comeau were top-notch and crucial to our information gathering.

Kim Raap, Ross Antworth, and Carl Lavigne also visited the Black Hills Snowmobile Trails System in South Dakota March 4-7, 2013 to view potential similarities and best management practices in comparing the potential new centralized Mount Carleton trail grooming operation with South Dakota's centralized grooming operation at its Hardy Work Center. A very special thank you to South Dakota Department of Game, Fish and Park's Park Manager Shannon Percy for his time, valuable insights, tour of their trails and Hardy shop facilities, and providing snowmobiles for Ross and Carl during this fact finding trip. Perspectives gained through this field trip proved to be extremely valuable while sorting through potential Mount Carleton grooming scenarios and forming final project recommendations.

This project could not have been completed without the extreme dedication, oversight, and direction from Ross Antworth, General Manager of the New Brunswick Federation of Snowmobile Clubs, and Carl Lavigne, Project Executive for the New Brunswick Department of Tourism, Heritage and Culture. A huge thank you goes out to both for their attention to details and coordination with multiple individuals and groups to make this project possible and successful. The leadership, input and oversight provided by Cindy Creamer Rouse, Director of Sales and Partnerships for the Department of Tourism, Heritage and Culture, and Martin MacMullin, Assistant Director of Park Operations for the Department of Tourism, Heritage and Culture, was also crucial to successful completion of this project in a timely manner.

Last but certainly not least, the superb mapping skills of Kyle Good, Trails Manager for the New Brunswick Federation of Snowmobile Clubs, was crucial to helping develop a wide range of potential grooming schedules and final maps for this plan. His extreme dedication, depth of knowledge for contributing information and details throughout the project and January field trip, overall professionalism, and willingness to consistently go 'above and beyond' are truly appreciated and were essential to making this project a success.

APPENDIX 1
Additional Environment Canada Weather Station Data

Table A-1: Average Snow Depth at Month-end (cm) {not available for the other stations}

Station Location	November	December	January	February	March	April
Mount Carleton Park Elevation: 265.10 m	8	23	38	52	36	3
Nictau Elevation: 169.7 m	7	33	50	60	33	1
Miramichi Elevation: 32.9 m	2	14	38	42	37	11
Doaktown Elevation: 57.0 m	9	39	74	104	70	2

Table A-2: Historic Extreme Snow Depth (cm and year/date)

Location	November	December	January	February	March	April
Mount Carleton Park Elevation: 265.1 m	42 (1986/22)	58 (1983/26)	93 (1994/18)	95 (1982/24)	130 (1982/08)	128 (1982/09)
Nictau Elevation: 169.7 m	34 (1986/24)	84 (1980/30)	122 (1979/01)	107 (2000/17)	120 (1995/07)	74 (1995/06)
Kedgwick Elevation: 274.3 m	17 (1989/29)	56 1989/07)	107 (1989/31)	109 (1991/20)	160 (1991/09)	114 (1991/01)
South Tetagouche Elevation:182.9 m	39 (1988/22)	96 (1989/20)	100 (1995/24)	137 (1988/21)	123 (1991/24)	86 (1994/04)
Bathurst Elevation: 4.6 m	59 (1986/23)	213 (1978/28)	97 (1990/31)	114 (1977/26)	122 (1977/25)	109 (1978/02)
Miramichi Elevation: 32.9 m	48 (1974/27)	81 (1970/27)	110 (1998/31)	133 (1995/18)	118 (1995/07)	106 (1997/03)
Doaktown Elevation: 57.0 m	50 (1989/29)	141 (1989/27)	183 (1998/21)	234 (1982/21)	246 (1982/02)	226 (1982/07)

Table A-3: Average Daily Temperature (°C)

Location	November	December	January	February	March	April	Annual
Mount Carleton Park Elevation: 265.10 m	-1.5	-9.2	-13.4	-11.9	-5.2	2	2.8
Nictau Elevation: 169.7 m	-1.2	-9.1	-12.9	-11.5	-5	2.8	3.2
Kedgwick Elevation: 274.3 m	-2.7	-11.2	-14.9	-13	-6	1.4	2
South Tetagouche Elevation:182.9 m	-1.2	-8.4	-12.2	-10.9	-5.1	1.9	3.4
Bathurst Elevation: 4.6 m	0.6	-7.7	-11.1	-9.5	-3.7	2.4	4.5
Miramichi Elevation: 32.9 m	0.5	-6.9	-10.7	-9.1	-3.3	3.1	4.7
Doaktown Elevation: 57.0 m	0.5	-7.1	-10.7	-9.4	-3.3	3.5	4.8

APPENDIX 2

Full Range of Potential New Trails Incorporated into Grooming Routes

Mt. Carleton Provincial Park #1 North and East

o From park HQ, #19 east to end of existing St. Quentin turnaround:	34 km
o New trail: Main IP Road and Portage Lake Road south to #504:	18 km
o Existing #504:	22 km
o New trail: connecting link through park back to HQ:	16 km
Total:	90 km
Approximate grooming hours:	9

Mt. Carleton Provincial Park #1A North and East (add #503)

o From park HQ, #19 east to end of existing St. Quentin turnaround:	34 km
o Beyond turnaround on #19 to #503:	8 km
o Existing #503:	25 km
o Existing #23 between #503 and #504:	9 km
o New trail: Main IP Road and Portage Lake Road south to #504 (doubled):	36 km
o Existing #504:	22 km
o New trail: connecting link through park back to HQ:	16 km
Total:	150 km
Approximate grooming hours:	15

Mt. Carleton Provincial Park #1B North and East (add loop to north of #19)

o From park HQ, #19 north and then back south to #19:	18 km
o New trail: loop north from #19 and then back south to #19:	37 km
o New trail: Main IP Road and Portage Lake Road south to #504:	18 km
o Existing #504:	22 km
o New trail: connecting link through park back to HQ:	16 km
Total:	111 km
Approximate grooming hours:	11.1

Mt. Carleton Provincial Park #2 East and South

o From park HQ, new connecting link through park to #504:	16 km
o Existing #504:	22 km
o Existing #23 southwest to #502 jct.:	48 km
o Existing #23 between #502 and #149 junctions:	17 km
o Existing #149 back to park HQ:	22 km
Total:	125 km
Approximate grooming hours:	12.5

Mt. Carleton Provincial Park #2A East and South (add new trail loop off of #23 south)

o From park HQ, connecting link through park to #504:	16 km
o Existing #504:	22 km
o Existing #23 south to new intersection at River Road:	11 km
o New trail: south from #23 on River Road, then west on Kagoot Brook Road:	27 km
o New trail: new on Birch Lake Road southwest to #58:	23 km
o Existing #58 north to #502 jct.:	14 km
o Existing #23 northwest to #149 jct.:	17 km
o Existing #149 north back to park HQ:	22 km
Total:	152 km
Approximate grooming hours:	15.2

Mt. Carleton Provincial Park #3 South and West

- From park HQ, #149 south to #23: 22 km
- Existing #23 southwest to Green Bridge Road: 19 km
- New trail: Green Bridge Road north to Little Tobique Road: 12 km
- New trail: Little Tobique Road north to #19: 13 km
- Existing #19 back to park HQ: 15 km

Total: 81 km

Approximate grooming hours: 8.1

Mt. Carleton Provincial Park #3A South and West (add side loop on Mount Edward Road)

- From park HQ, #149 south to Mount Edward Road: 13 km
- New trail: Mount Edward Road east and south to #23: 27 km
- Existing #23 northwest to #149 junction: 9 km
- Existing #23 southwest to Green Bridge Road: 19 km
- New trail: Green Bridge Road north to Little Tobique Road: 12 km
- New trail: Little Tobique Road north to #19: 13 km
- Existing #19 back to park HQ: 15 km

Total: 108 km

Approximate grooming hours: 10.8

Mt. Carleton Provincial Park #4 South (new south trail from Riley Brook to Serpentine)

- From park HQ, #149 south to #23 jct.: 22 km
- Existing #23southeast to #502 jct.: 17 km
- Existing #502 south to Serpentine Lake: 7 km
- New trail: south from Serpentine and then northwest to #23 near Riley Brook: 47 km
- Existing #23 north to Green Bridge Road: 8 km
- New trail: Green Bridge Road north to Little Tobique Road: 12 km
- New trail: Little Tobique Road north to #19: 13 km
- Existing #19 back to park HQ: 15 km

Total: 141 km

Approximate grooming hours: 14.1

Mt. Carleton Provincial Park #4A South (new south trail from Riley Brook to Serpentine)

- From park HQ, #149 south to #23 jct.: 22 km
- Existing #23southeast to #502 jct.: 17 km
- Existing #502 south to Serpentine Lake: 7 km
- New trail: south from Serpentine and then northwest to #23 near Riley Brook: 47 km
- Existing #23 north to #149 jct.: 27 km
- Existing #149 back to park HQ: 22 km

Total: 142 km

Approximate grooming hours: 14.2

Or have this new loop groomed by Plaster Rock:

Plaster Rock (new south trail from Riley Brook to Serpentine)

- Existing #23 north to #149 jct.: 68 km
- Existing #23 southeast to #502 jct.: 17 km
- Existing #502 to Serpentine Lake: 7 km
- New trail: south from Serpentine and then northwest to #23 near Riley Brook: 47 km
- Existing #23 south back to Plaster Rock: 41 km

Total: 180 km
Approximate grooming hours: 18

NOTE: + 47 kilometers of new trail for + 10 kilometers of additional grooming (+ 1 hour); compared to 170 kilometers of existing out-and-back grooming

Mt. Carleton Provincial Park #5 South (adding new trail in the Christmas Mountains)

- From park HQ, #149 south to #23 jct.: 22 km
- Existing #23southeast to #502 jct.: 17 km
- Existing #58 south to south end of new loop: 42 km
- New trail: north to Birch Lake Road: 40 km
- New trail: Birch Lake Road west back to #58: 23 km
- Existing #58 north to #502 jct.: 14 km
- Existing #23 northwest to #149 jct.: 17 km
- Existing #149 north back to park HQ: 22 km

Total: 197 km
Approximate grooming hours: 19.7

Mt. Carleton Provincial Park #5A South (adding new trail in the Christmas Mountains)

- From park HQ, #149 south to #23 jct.: 22 km
- Existing #23southeast to #502 jct.: 17 km
- Existing #58 south to south end of new loop at Long Lake Road: 42 km
- New trail: north to Birch Lake Road: 40 km
- New trail: Birch Lake Road east to Bathurst Road: 2 km
- New Trail: Bathurst Road north to #23: 5 km
- Existing #23 north to #504 jct.: 21 km
- Existing #504 and new link through Mt. Carleton back to park HQ: 38 km

Total: 187 km
Approximate grooming hours: 18.7

Governors – could be operated by MC or Nepis. (adding new trail in the Christmas Mountains)

- From Governors Resort: existing #23 south to new intersection at River Road: 11 km
- New trail: south from #23 on River Road, then west on Kagoot Brook Road: 27 km
- New trail: new on Birch Lake Road southwest to #58: 23 km
- Existing #58 south to south end of new loop at Long Lake Road: 28 km
- New trail: north to Birch Lake Road: 40 km
- New trail: Birch Lake Road east to Bathurst Road: 2 km
- New Trail: Bathurst Road north to #23: 5 km
- Existing #23 north back to Governors: 21 km

Total: 157 km
Approximate grooming hours: 15.7

Serpentine Lake #1 – operated by Mt. Carleton (adding new trail in the Christmas Mountains)

- From Serpentine Lodge: Existing #502 northeast to #58: 7 km
- Existing #58 south to south end of new loop: 42 km
- New trail: north to Birch Lake Road: 40 km
- New trail: Birch Lake Road west back to #58: 23 km
- Existing #58 north to #502 jct.: 14 km
- Existing #502 southwest back to Serpentine: 7 km

Total: 133 km
Approximate grooming hours: 13.3

Serpentine Lake #2 – operated by Mt. Carleton (new south trail from Riley Brook to Serpentine)

- New trail: from Serpentine south and then northwest to #23 near Riley Brook: 47 km
- Existing #23 north to #149 jct.: 27 km
- Existing #23southeast to #502 jct.: 17 km
- Existing #502 south back to Serpentine Lake: 7 km

Total: 98 km

Approximate grooming hours: 9.8

Doaktown #1 (adding new trail in the Christmas Mountains)

- Existing #58 from Doaktown to #502 jct.: 146 km
- Existing #502 to Serpentine, doubled: 14 km
- Existing #58 back south to Birch Lake Road: 14 km
- New trail: northeast on Birch Lake Road: 23 km
- New trail: south from Birch Lake Road back to #58 on Long Lake Road: 40 km
- Existing #58 back to Doaktown: 104 km

Total: 341 km

Approximate grooming hours: 34.1

NOTE: + 63 kilometers of new trail for +35 kilometers of additional grooming (+3.5 hours); compared to 306 kilometers of existing out-and-back grooming

Doaktown #1A (giving new trail in Christmas Mountains to Mt. Carleton, plus shorten route)

- Existing #58 from Doaktown to south end of new loop: 104 km
- Existing #58, turn around and return to Doaktown: 104 km

Total: 208 km

Approximate grooming hours: 20.8

NOTE: eliminates 98 kilometers of grooming (minus 9.8 hours); however also eliminates opportunity to over-night at Serpentine Lodge

St. Quentin #1 (new trail loop south)

- Existing #19 toward Park, but only to Little Tobique Road: 35 km
- New trail: Little Tobique Road south to Green Bridge Road: 13 km
- New trail: Green Bridge Road northwest then north on Big Cedar Road to #19: 24 km
- Existing #19 back to St. Quentin: 12 km

Total: 84 km

Approximate grooming hours: 8.4

NOTE: existing roundtrip grooming from St. Quentin to Mt. Carleton Park totals 100 kilometers; + 37 kilometers of new trail for 16 fewer kilometers of grooming (minus 1.6 hours grooming)

St. Quentin #2 (new trail loop north)

- Existing #19 east to Mt. Carleton Park: 50 km
- Existing #19 northeast to Main IP Road 34 km
- New trail: north on Main IP Road: 20 km
- New trail: west to #17 near Kedgwick: 60 km
- Existing #17 and #28 back to St. Quentin: 32 km

Total: 196 km

Approximate grooming hours: 19.6

NOTE: + 74 kilometers of new trail for +10 kilometers of additional grooming (+ 1 hour); compared to 186 kilometers of existing out-and-back grooming

St. Quentin #2A (new trail loop north)

o Existing #19 east to Mt. Carleton Park:	50 km
o Existing #19 northeast to new loop:	18 km
o New trail: north from #19:	17 km
o New trail: west to #17 near Kedgwick:	54 km
o Existing #17 and #28 back to St. Quentin:	32 km
Total:	171 km
Approximate grooming hours:	17.1

NOTE: + 71 kilometers of new trail for minus 15 kilometers of grooming (minus 1.5 hours); compared to 186 kilometers of existing out-and-back grooming

APPENDIX 3

Grooming Schedule Scenario for '1 TRACTOR WITH 2 OPERATORS'
Mount Carleton Area: existing trails, with only new trail being the through-park connector

Day 1, Thursday night – Operator #1

○ From park HQ, #19 east to #503:	42 km
○ #503 south to #23:	25 km
○ #23 to #504:	9 km
○ Existing #504 and new trail link through park back to HQ:	38 km
Total:	114 km
Approximate grooming hours:	11.4

Day 2, Friday night – Operator #1

○ From park HQ, #149 south to #23:	22 km
○ #23 southwest to Green Bridge Road:	19 km
○ Double back on #23 to #149 intersection:	19 km
○ #23 southeast and then northeast to #504:	65 km
○ Existing #504 and new trail link through park back to HQ:	38 km
Total:	163 km
Approximate grooming hours:	16.3

Day 3, Saturday night – Operator #1

○ From park HQ, east on new link through park and #504 to #23:	38 km
○ #23 east to #503:	9 km
○ #503 north to #19:	25 km
○ #19 west back to HQ:	42 km
Total:	114 km
Approximate grooming hours:	11.4

Operator #1: total weekly grooming hours = 39.1

Day 4, Sunday night – Operator #2

○ From park HQ, #149 south to #23:	22 km
○ #23 southwest to Green Bridge Road:	19 km
○ Double back on #23 to #149 intersection:	19 km
○ #23 southeast to #502:	17 km
○ #502 to Serpentine Lodge for overnight/day:	7 km
Total:	84 km
Approximate grooming hours:	8.4

Day 5, Monday night – Operator #2

○ From Serpentine Lodge, #502 to #58:	7 km
○ #58 south to Hwy. 108:	62 km
○ Double back on #58 and #502 for second Overnight/day at Serpentine Lodge:	69 km
Total:	138 km
Approximate grooming hours:	13.8

Day 6, Tuesday night – Operator #2

○ From Serpentine Lodge, #502 to #23:	7 km
○ #23 northeast to #504:	48 km
○ Existing #504 and new trail link through park back to HQ:	38 km
Total:	93 km
Approximate grooming hours:	9.3

Operator #2: total weekly grooming hours = 31.5

Tractor: off for service Wednesday

Day 7, Wednesday – Operator #2
- Perform tractor maintenance: 7.5 hours

Operator #2: total weekly hours = 40

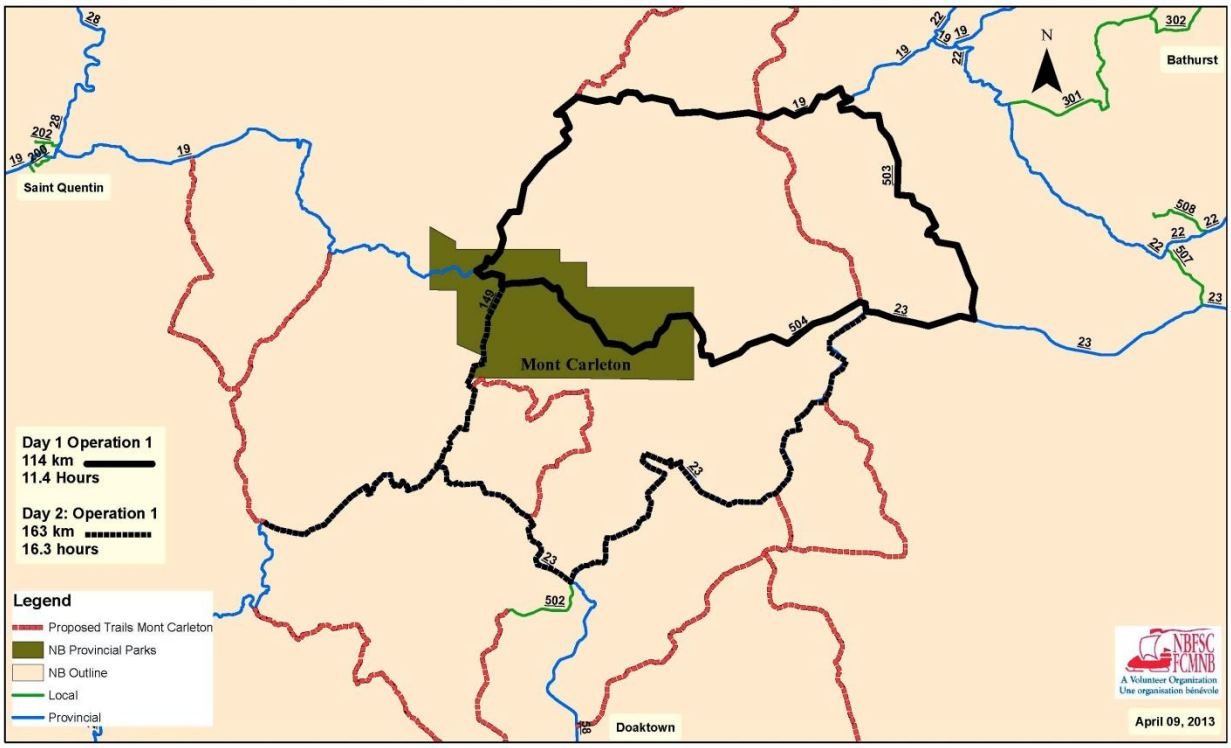
Tractor: total weekly grooming hours = 70.6

Labor: total weekly hours for 1 tractor and 2 employees @ 40 hours = 80

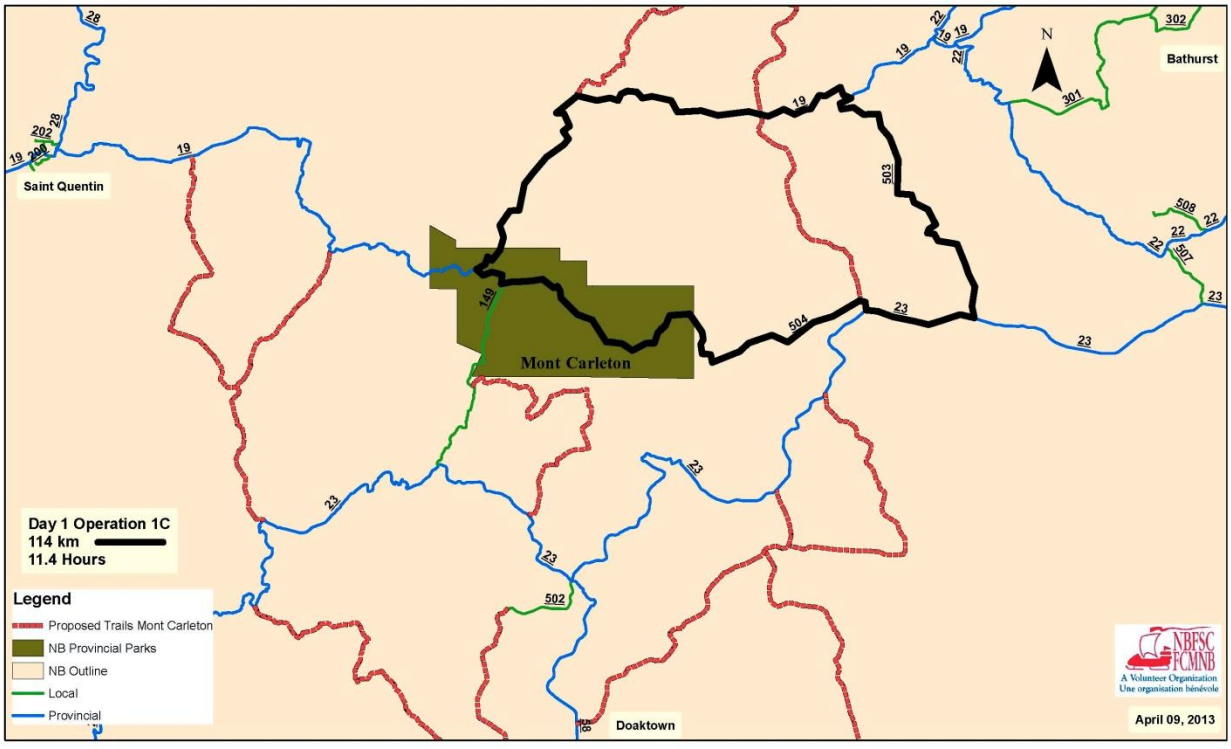
APPENDIX 4

Potential Grooming Route Maps to go with '1 Tractor' based at Mount Carleton Park (in black)

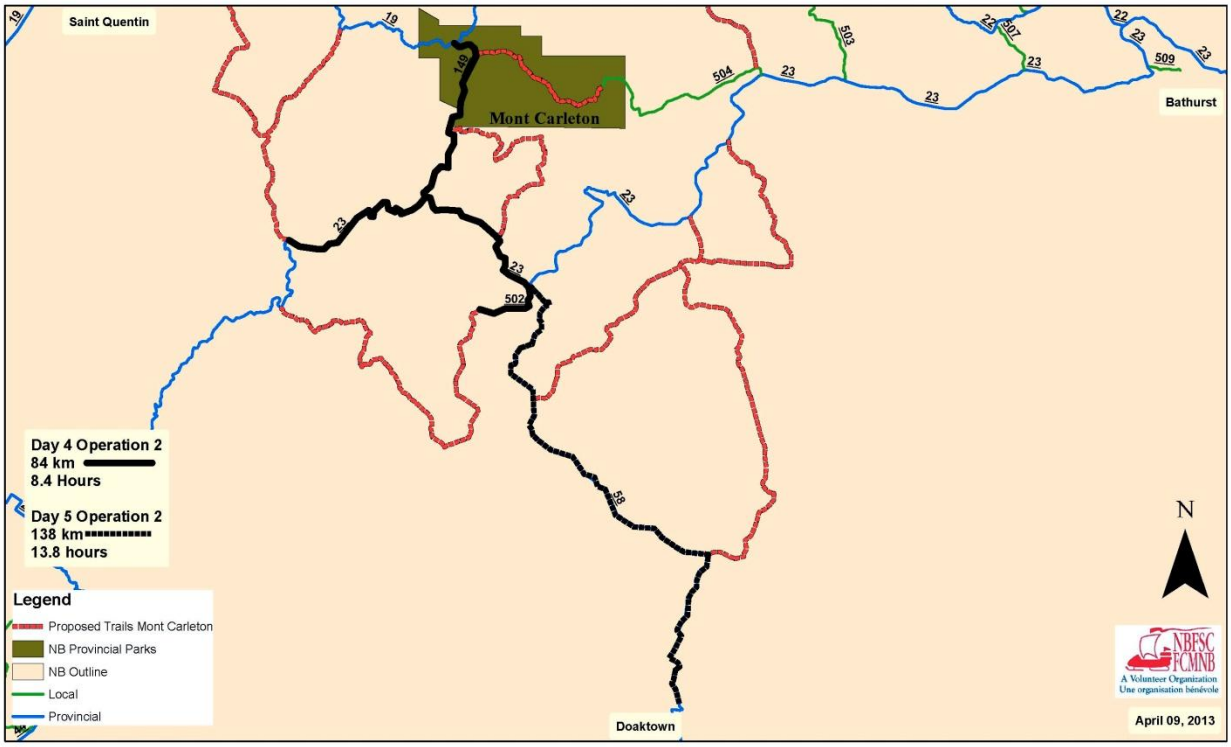
Map A4.1: 1 Mt. Carleton Tractor: Days 1 & 2 (Thursday {top loop} and Friday {lower loop} nights)



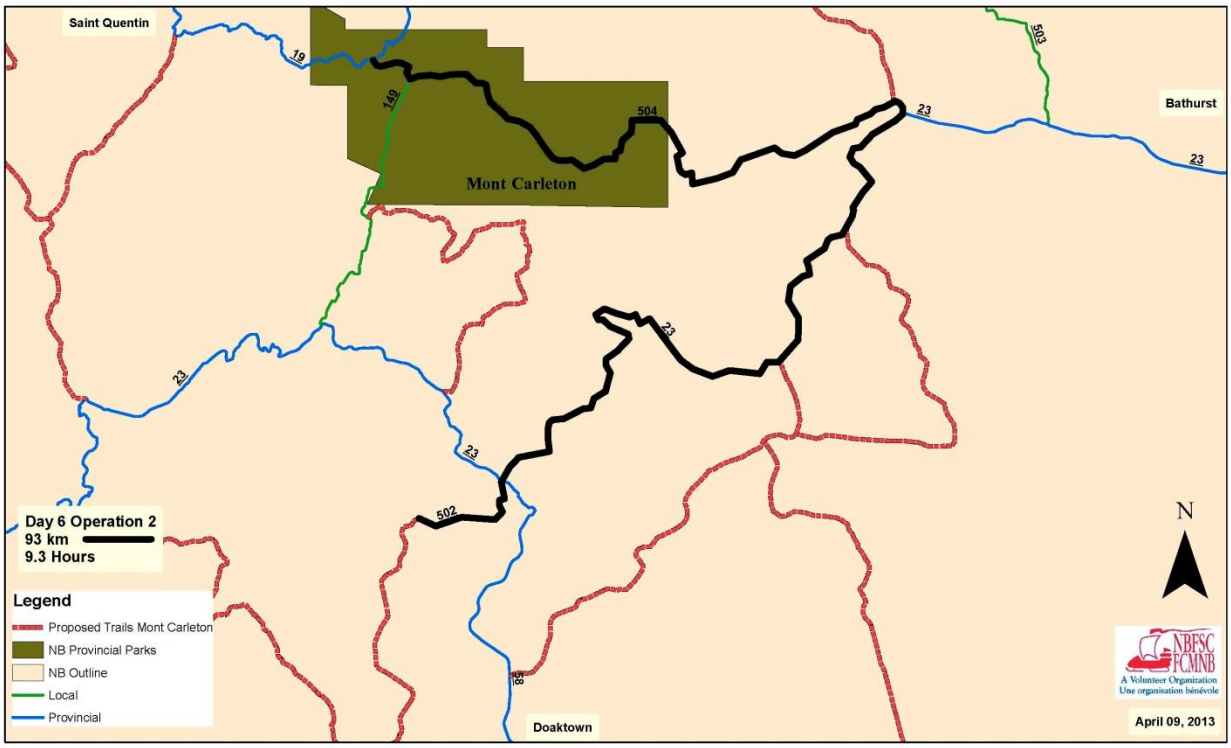
Map A4.2: 1 Mt. Carleton Tractor: Day 3 (Saturday night)



Map A4.3: 1 Mt. Carleton Tractor: Days 4 and 5 (Sunday {to Serpentine} and Monday {Serpentine south and back} nights, with a stay over at Serpentine Lodge)



Map A4.4: 1 Mt. Carleton Tractor: Day 6 (Tuesday night {return from Serpentine})



1 Mt. Carleton Tractor: Day 7 = designated for tractor service and trail clean-up work around the park, including to Mt. Carleton summit observation area

APPENDIX 5

Optimum Grooming Schedule Scenario: '2 TRACTORS WITH 4 OPERATORS'
Mount Carleton Area: existing trails plus all potential new trail routes

TRACTOR #1

Day 1, Thursday night – Operator #1

- From park HQ, connecting link through park and #504 to #23: 38 km
- #23 south to new intersection at River Road: 11 km
- New trail: south from #23 on River Road, then west on Kagoot Brook Road: 27 km
- New trail: Bathurst Road north to #23: 5 km
- #23 southwest and then northwest to #149: 44 km
- #149 north back to park HQ: 22 km

Total: 147 km
Approximate grooming hours: 14.7

Day 2, Friday night – Operator #1

- From park HQ, #19 east to #503: 42 km
- #503 south to #23: 25 km
- #23 west to #504 and intersection of new trail north on Portage Lake Road: 9 km
- New trail: north on Portage Lake Road to #19, and doubled back to #504: 36 km
- #504 and new connecting link through park, west back to HQ: 38 km

Total: 150 km
Approximate grooming hours: 15

Day 3, Saturday night – Operator #1

- From park HQ, #149 south to Mount Edward Road: 13 km
- New trail: Mount Edward Road east and south to #23: 27 km
- #23 west past #149 intersection to Green Bridge Road : 28 km
- New trail: Green Bridge Road north to Little Tobique Road: 12 km
- New trail: Little Tobique Road north to #19: 13 km
- #19 back to park HQ: 15 km

Total: 108 km
Approximate grooming hours: 10.8

Operator #1: total weekly grooming hours = 40.5

Day 4, Sunday night – Operator #2

- From park HQ, #19 north to new trail on Caribou Road: 18 km
- New trail: loop north on Caribou Road and then back south on Main IP Road to #19: 37 km
- #19 east to #503: 8 km
- #503 south to #23: 25 km
- #23 west to #504: 9 km
- #504 and new connecting link through park, west back to HQ: 38 km

Total: 135 km
Approximate grooming hours: 13.5

Day 5, Monday night – Operator #2

- From park HQ, #19 north and east to new trail at Portage Lake Road: 34 km
- New trail: Portage Lake Road south to #23: 18 km
- #23 south and west to #149: 65 km
- #149 north back to HQ: 22 km

Total: 139 km
Approximate grooming hours: 13.9

Operator #2: sub-total of weekly grooming hours from Tractor #1 = 27.4

Tractor #1: total weekly grooming hours = 67.9

Tractor #1: off for service Tuesday-Wednesday

TRACTOR #2

Day 1, Thursday night – Operators #2 & #3 (switch by vehicle in Kedgwick or St. Quentin)

o From park HQ, #19 north to new trail on Caribou Road:	18 km
o New trail: north from #19 on Caribou Road:	17 km
o New trail: west from Caribou Road to #17 near Kedgwick:	54 km
o #17 and #28 back to St. Quentin:	32 km
o #19 east back to HQ:	50 km
Total:	171 km
Approximate grooming hours:	17.1

Operator #2: 8 grooming hours from Tractor #2, plus 1 hour drive time to park = 9
Total of weekly grooming hours for tractors #1 & #2 = 36.4

Operator #3: 9.1 grooming hours from Day 1, plus 1 hour drive time to park = 10.1

Day 2, Friday night – Operator #3

o From park HQ, #149 south to #23:	22 km
o #23southeast to #502:	17 km
o #502 south to Serpentine Lake:	7 km
o New trail: south from Serpentine and then northwest to #23 near Riley Brook:	47 km
o #23 northeast to #149:	27 km
o #149 north back to park HQ:	22 km
Total:	142 km
Approximate grooming hours:	14.2

Day 3, Saturday night – Operator #3

o From park HQ, new link through park and #504 to #23:	38 km
o #23 to east to #503, then doubled back to #504:	18 km
o #23 southwest to #502 and then northwest to #149:	65 km
o #149 north back to park HQ:	22 km
Total:	143 km
Approximate grooming hours:	14.3

Operator #3: total weekly grooming hours = 38.6

Day 4, Sunday night – Operator #4

o From park HQ, #19 west to Big Cedar Road:	38 km
o New trail: Big Cedar Road south to Green Bridge Road:	24 km
o New trail: Green Bridge Road south to #23:	12 km
o #23 east to #502:	36 km
o #502 to Serpentine Lodge; overnight/day	7 km
Total:	117 km
Approximate grooming hours:	11.7

Day 5, Monday night – Operator #4

o From Serpentine lodge, #502 to #58:	7 km
o #58 south to south end of new loop at Long Lake Road:	42 km
o New trail: north on Long Lake Road to Birch Lake Road:	40 km
o New trail: Birch Lake Road southwest back to #58:	23 km
o Existing #58 north to #502:	14 km
o #502 to Serpentine Lodge; overnight/day	7 km
Total:	133 km
Approximate grooming hours:	13.3

Day 6, Tuesday night – Operator #4

o New trail: from Serpentine south and then northwest to #23:	47 km
o #23 north to Green Bridge Road:	7 km
o New trail: Green Bridge Road north to Little Tobique Road:	12 km
o New trail: Little Tobique Road north to #19:	13 km
o #19 east back to park HQ:	15 km
Total:	94 km
Approximate grooming hours:	9.4

Operator #4: total weekly grooming hours = 34.4

Tractor #2: total weekly grooming hours = 80

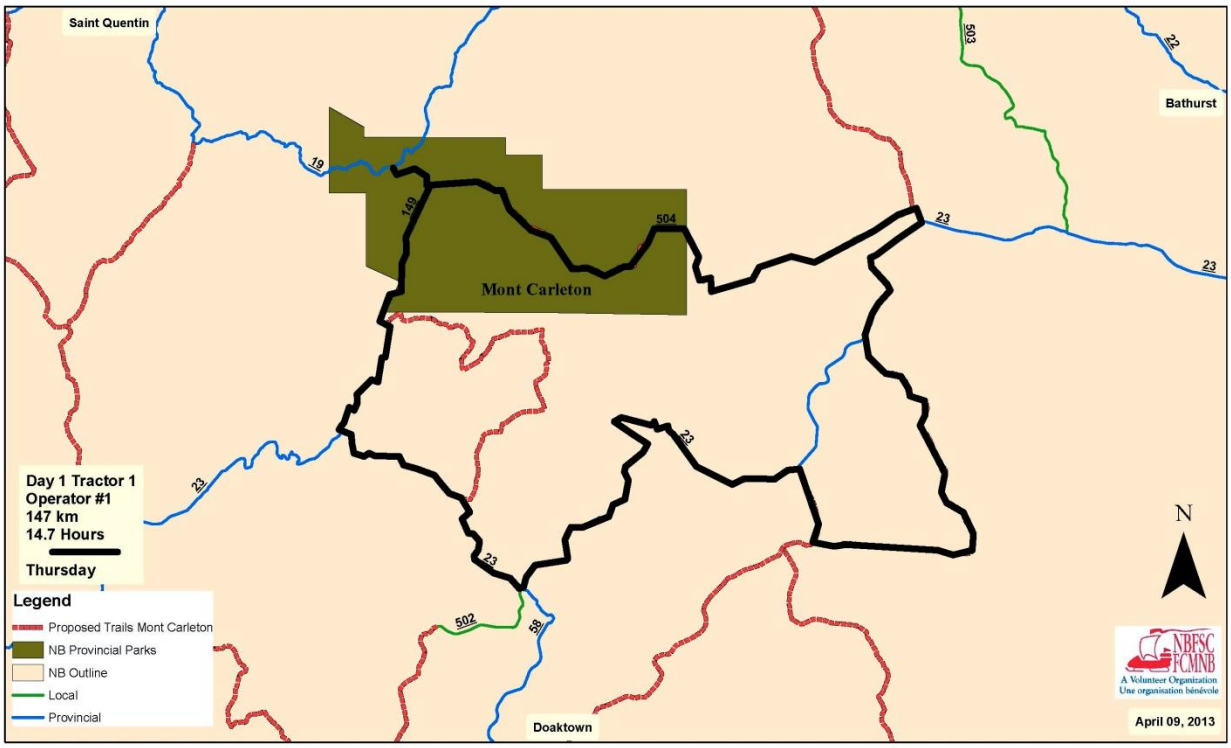
Tractor #2: off for service Wednesday

Labor: total weekly hours for 2 tractors and 4 employees @ 40 hours = 160

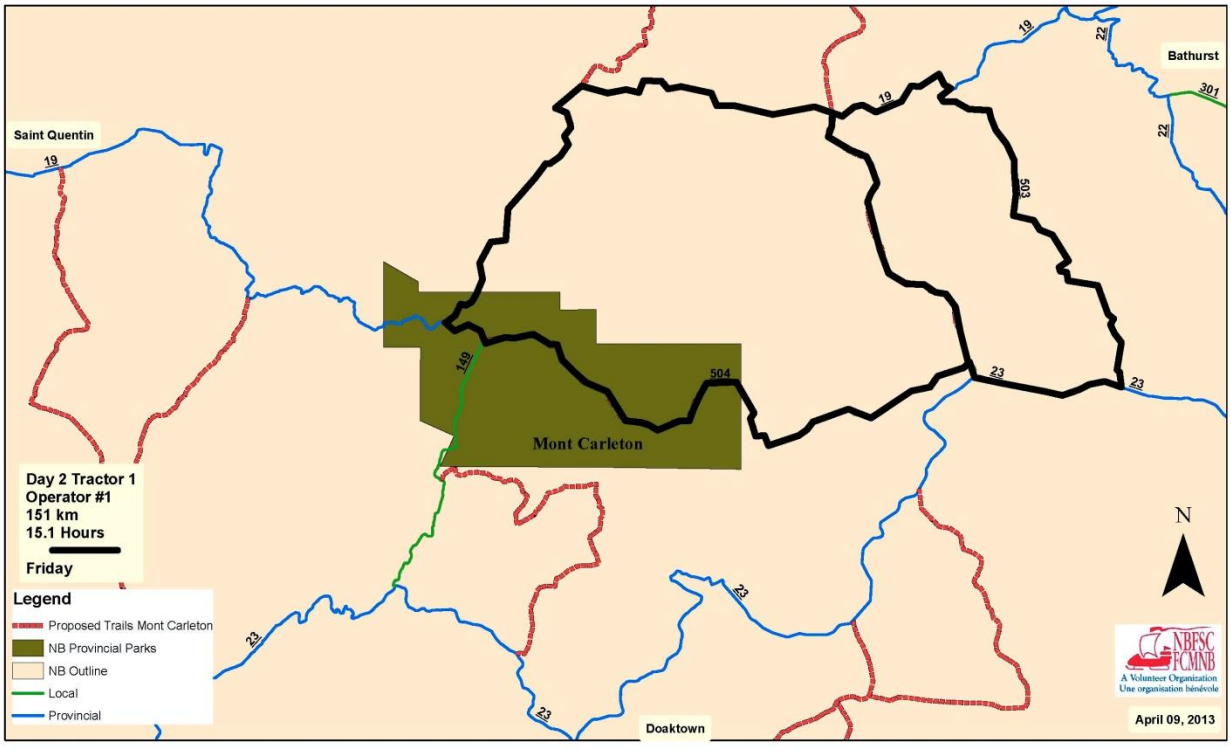
APPENDIX 6

Potential Grooming Route Maps to go with '2 Tractors' based at Mount Carleton Park (in black)

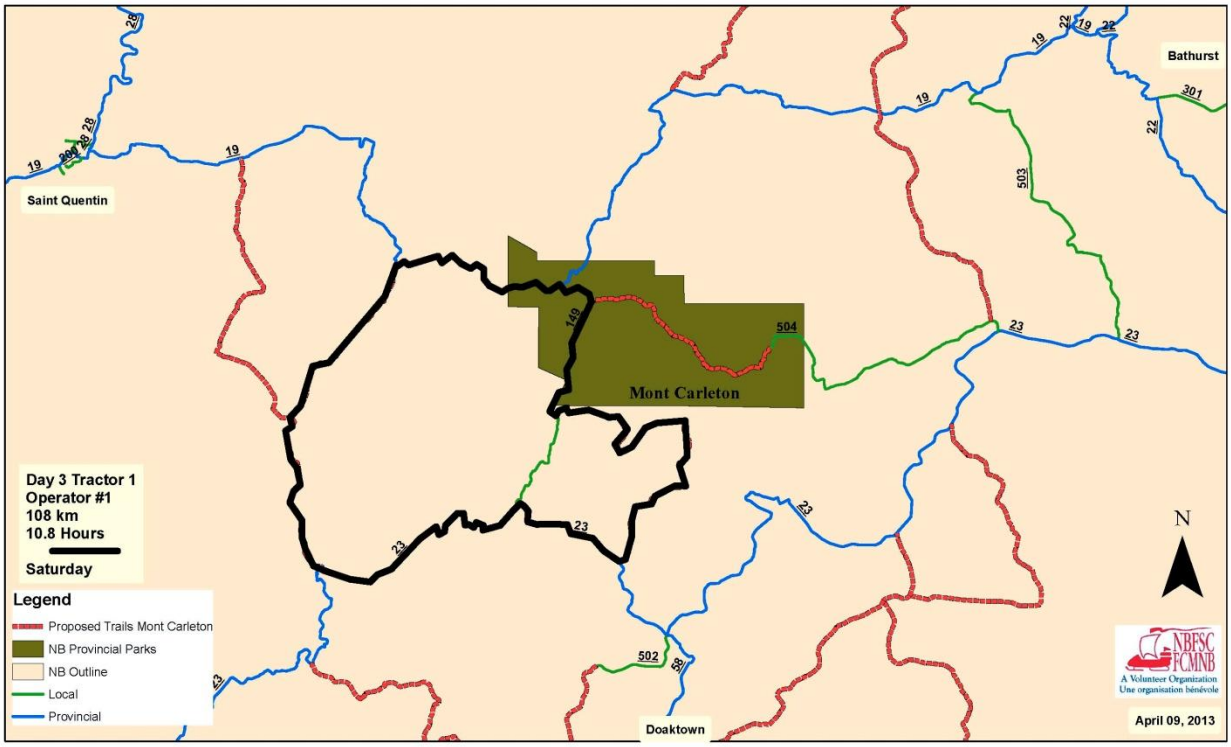
Map A6.1: 2 Mt. Carleton Tractors: Tractor # 1, Day 1, Operator #1 (Thursday night)



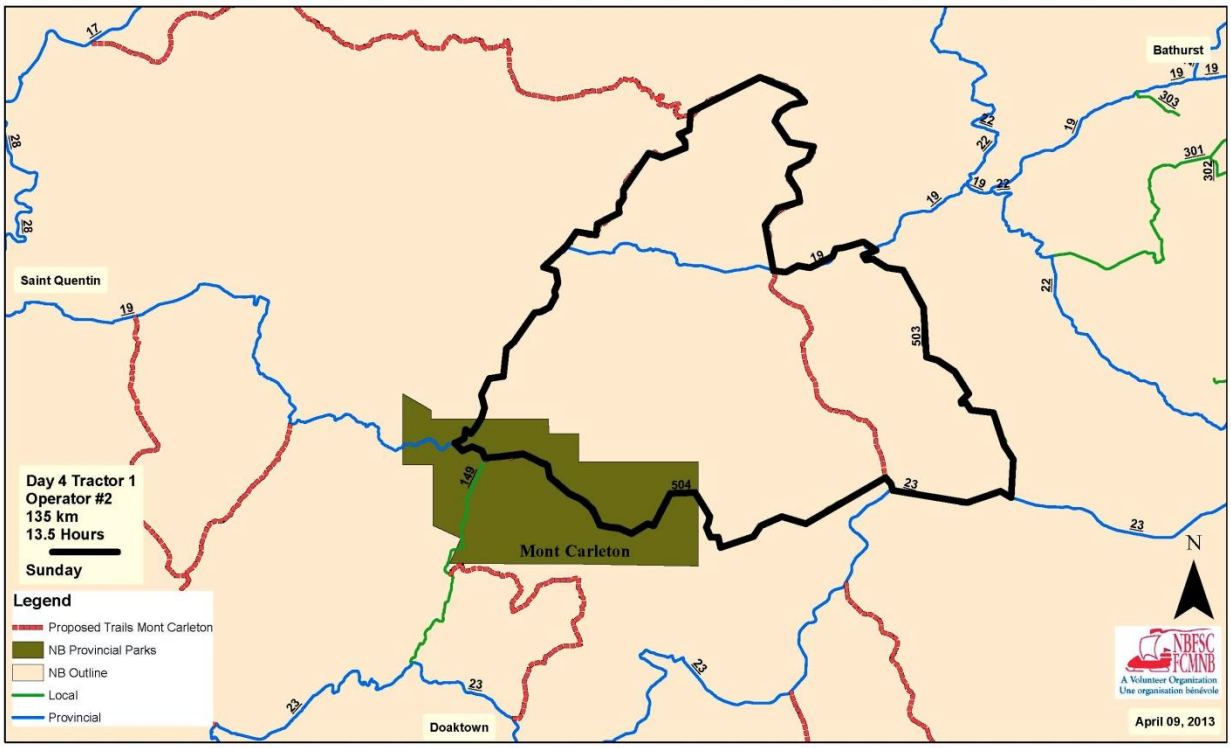
Map A6.2: 2 Mt. Carleton Tractors: Tractor #1, Day 2, Operator #1 (Friday night)



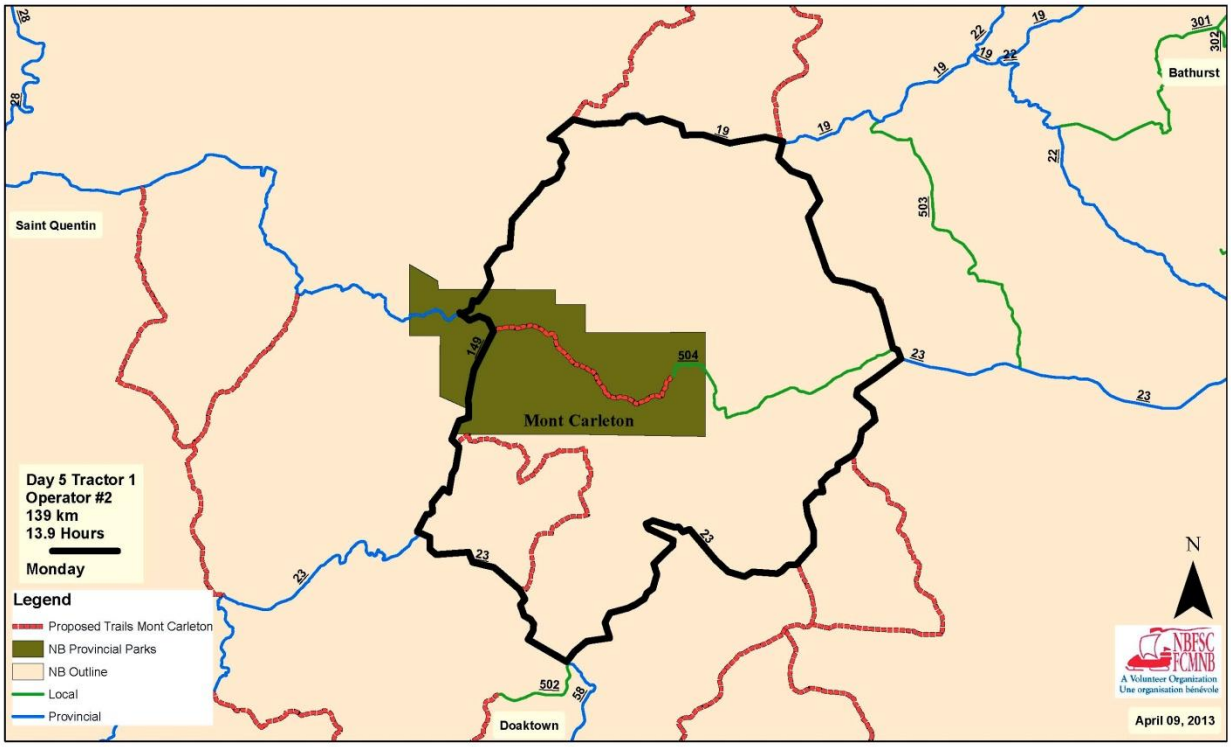
Map A6.3: 2 Mt. Carleton Tractors: Tractor # 1, Day 3, Operator #1 (Saturday night)



Map A6.4: 2 Mt. Carleton Tractors: Tractor # 1, Day 4, Operator #2 (Sunday night)

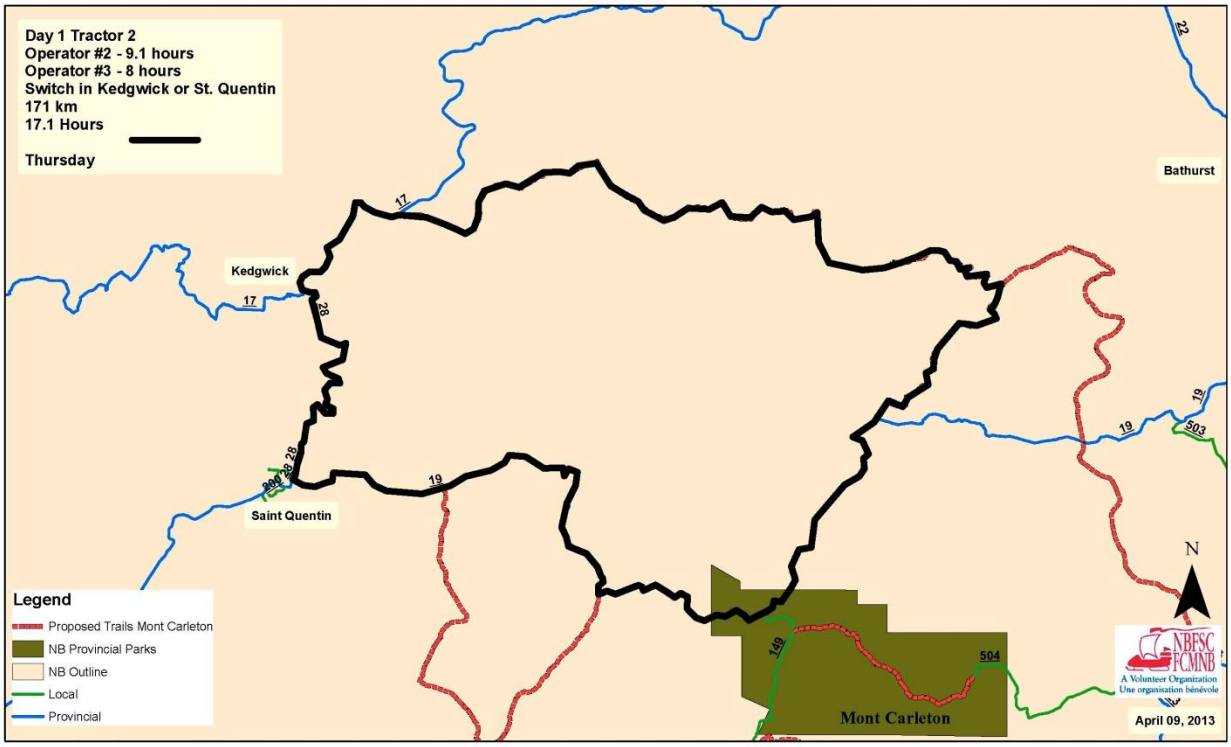


Map A6.5: 2 Mt. Carleton Tractors: Tractor # 1, Day 5, Operator #2 (Monday night)

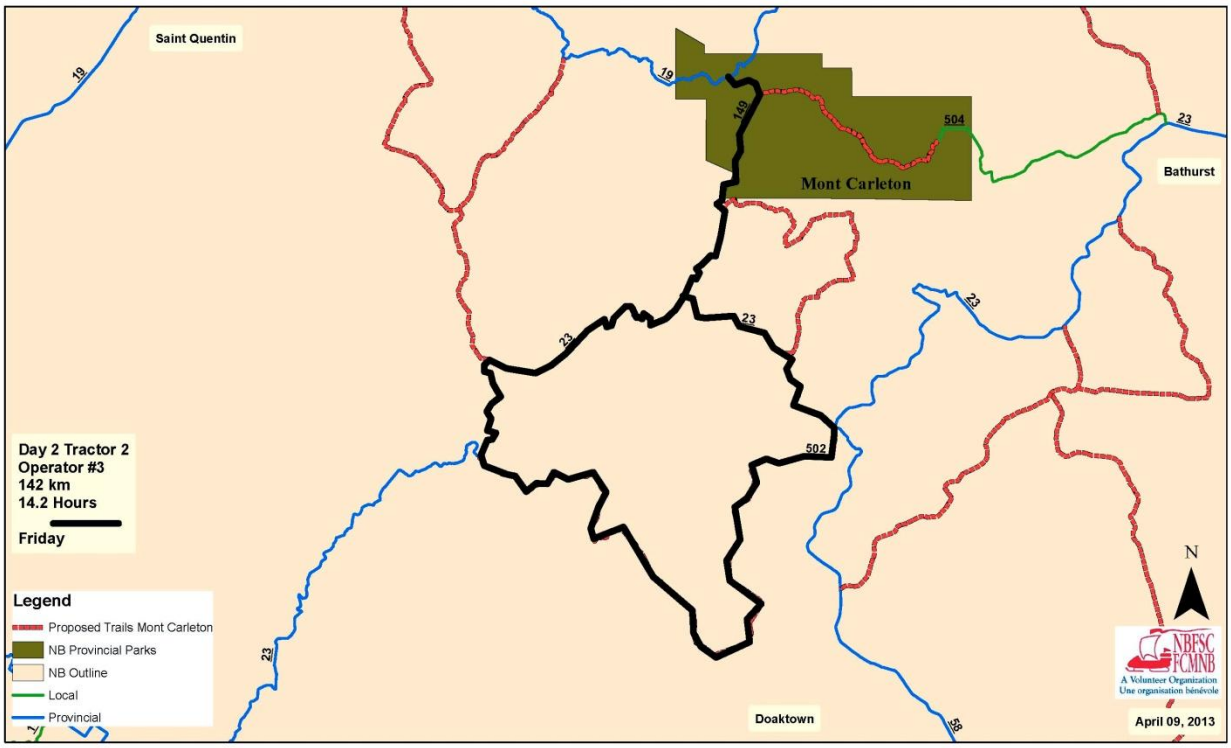


2 Mt. Carleton Tractors: Tractor #1, Days 6 and 7 (Tuesday, Wednesday) = designated for tractor service and trail clean-up work around the park, including to Mt. Carleton summit observation area; also could be available for additional grooming runs on one of the off days

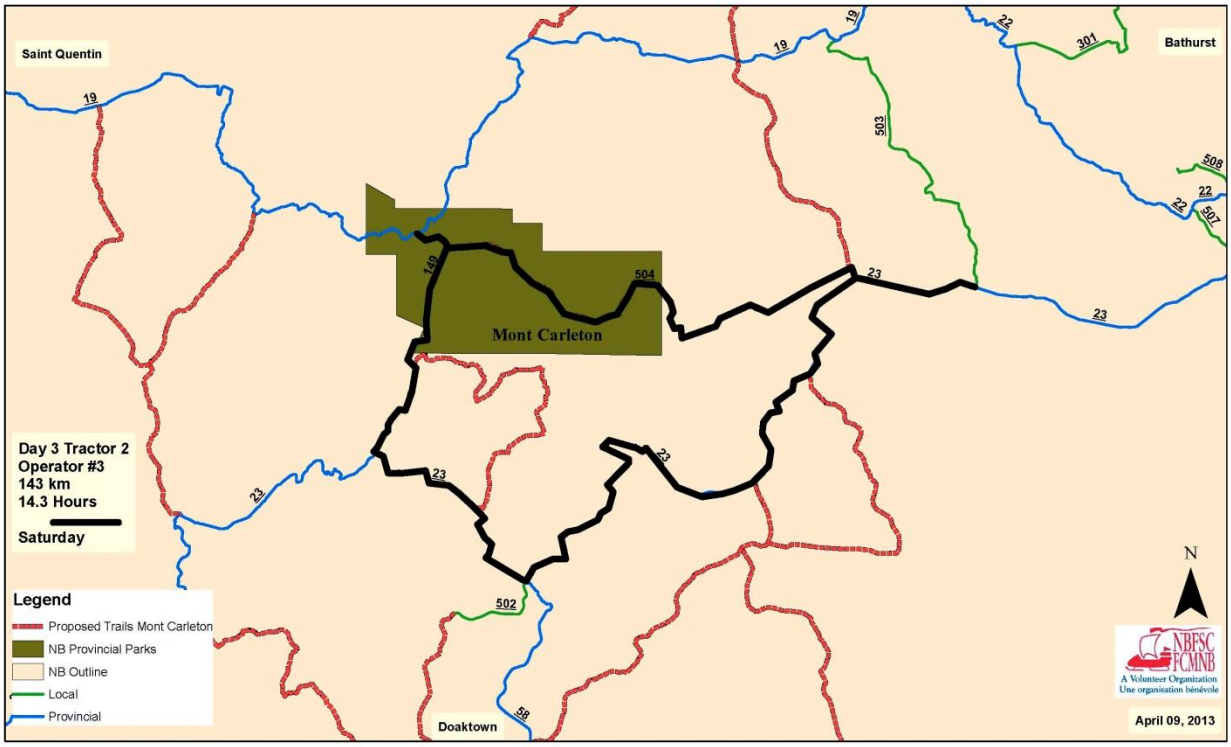
Map A6.5: 2 Mt. Carleton Tractors: Tractor # 2, Day 1, Operators #2 & #3 (Thursday night, operators switch at St. Quentin or Kedgwick)



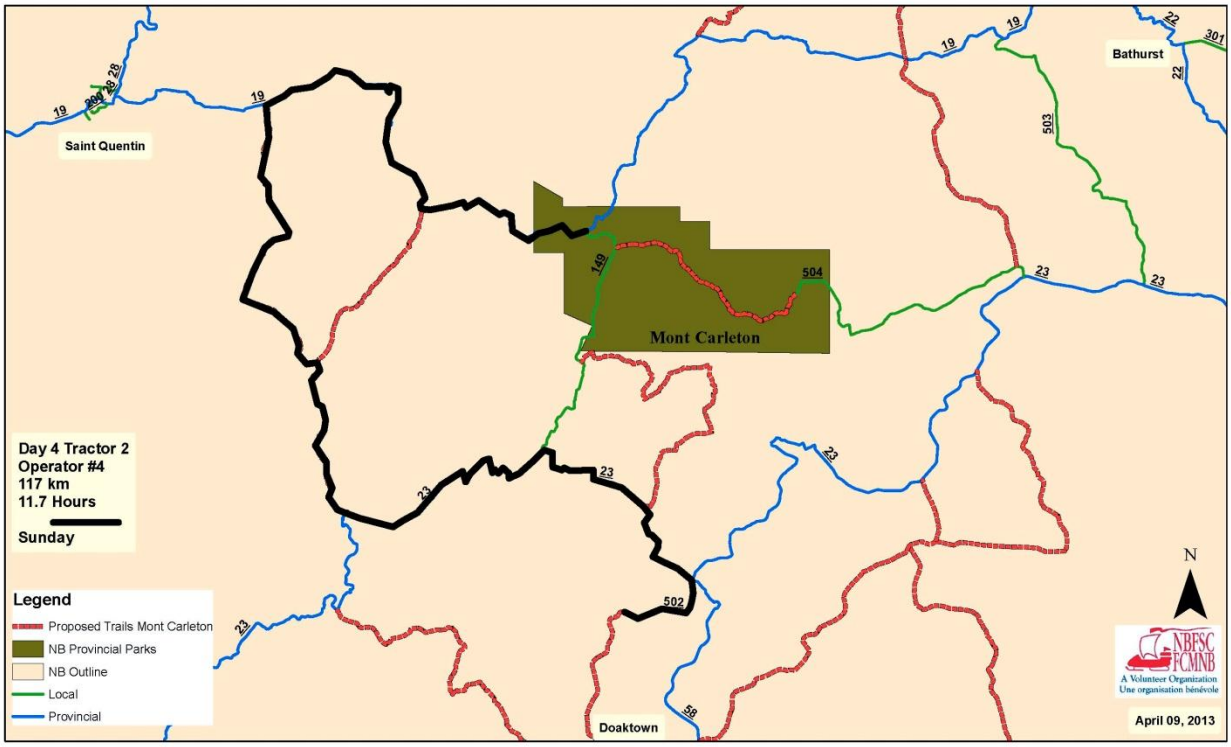
Map A6.7: 2 Mt. Carleton Tractors: Tractor #2, Day 2, Operator #3 (Friday night)



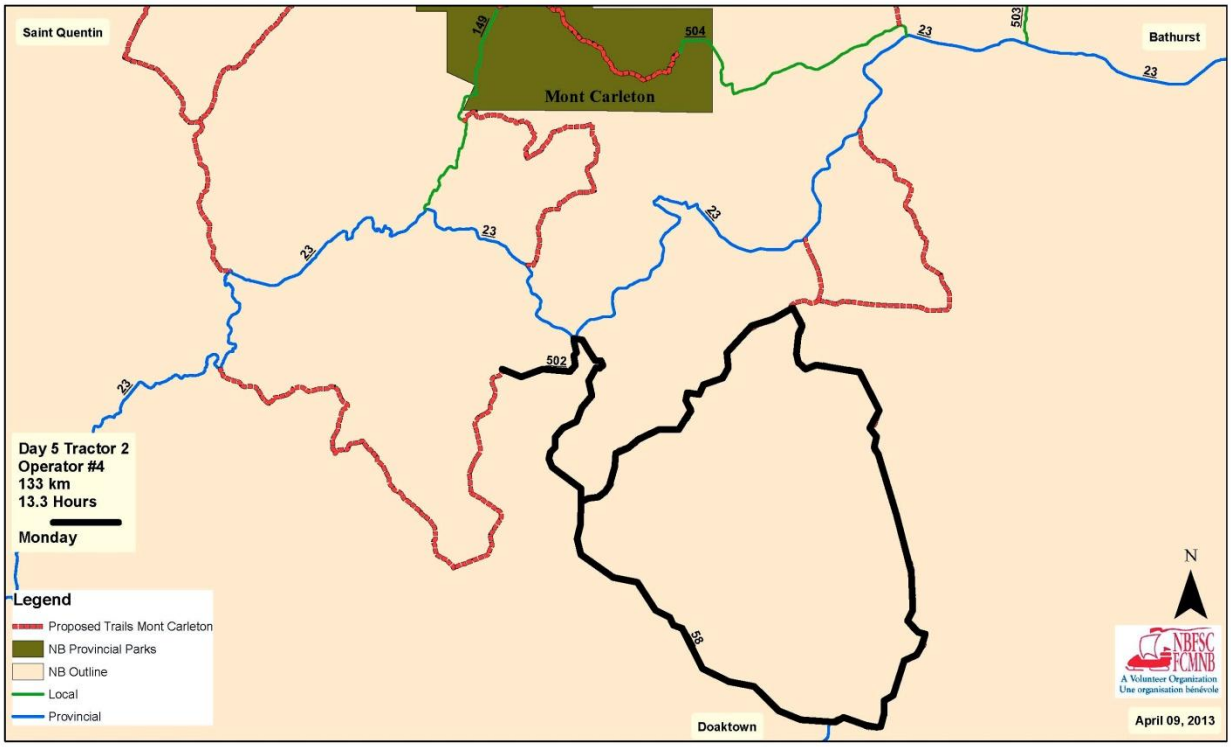
Map A6.8: 2 Mt. Carleton Tractors: Tractor # 2, Day 3, Operator #3 (Saturday night)



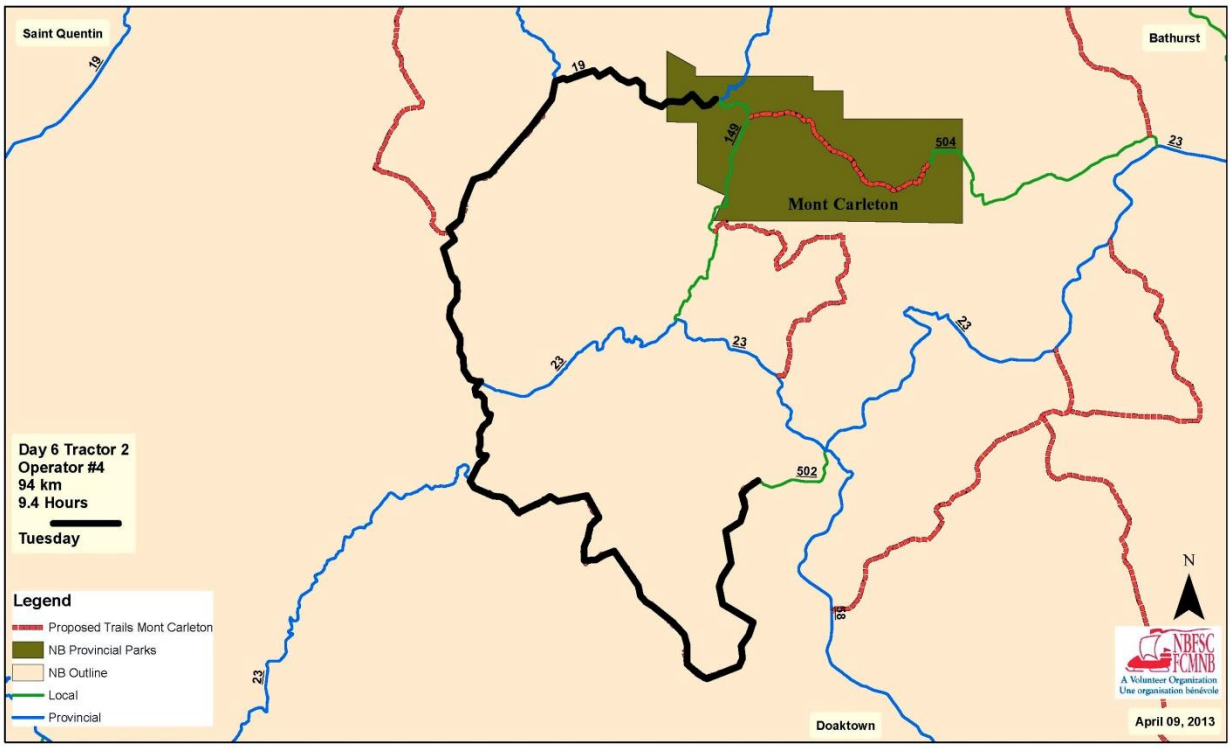
Map A6.9: 2 Mt. Carleton Tractors: Tractor # 2, Day 4, Operator #4 (Sunday night, over stay at Serpentine)



Map A6.10: 2 Mt. Carleton Tractors: Tractor # 2, Day 5, Operator #4 (Monday night, over stay at Serpentine)



Map A6.11: 2 Mt. Carleton Tractors: Tractor # 2, Day 6, Operator #4 (Tuesday night, return from Serpentine)



2 Mt. Carleton Tractors: Tractor #2, Day 7 (Wednesday) = designated for tractor service

APPENDIX 7

Example Sno-Cat Maintenance Schedule

Sno-Cat Year, Model & Location:	2008 R169 – Chains End					
Starting Hours:	286					
PART	**SERVICE INTERVAL**	**HOURS or DATE OF SERVICE**				
Primary Fuel Filter	Every 500 hours					
Secondary Fuel Filter	Every 500 hours					
Engine Oil Filter & Oil	Every 250 hours					
Primary Hydraulic Filter	Once a year					
Secondary Hydraulic Filter	Once a year					
Air Filter	When it needs it					
Transmission Filter & Oil	Once a year					
Transfer Case Filter & Oil	Once a year					
Front & Rear Differential Oil	Once a year					
Carrier Wheels & Oil	Once a year					
Serpentine Fan Belt	6 cracks per inch					
SNO-CAT PARTS	**Model Year:**	**2008**	**2007**	**2006**	**2004**	**2003**
Filter Type		**Number**	**Number**	**Number**	**Number**	**Number**
Air		88710	87919	87919	87919	87919
Engine Oil		84182	85607	85607	85607	85607
Hydraulic Oil Primary		85551	85551	85551	85551	85551
Hydraulic Oil Secondary		85735	85746	85746	N/A	N/A
Transmission		96054	96054	96054	96054	96054
Fuel Primary		FF5612	86405	86405	86405	86405
Fuel Secondary		FF20022	FS20000	FS20000	86358	86358
Transfer Case		85551	85551	85551	85622	85622
				Note: FS20000 is Car Quest 86940		
Comments:						

APPENDIX 8

Date of Service:			**SNOW CAT SERVICE SHEET**	
Hours:				
Technician:				
FLUIDS	**Check Level**	**Changed**	**Type**	**Vendor**
Engine Oil				
Front Differential				
Rear Differential				
Transmission				
Transfer Case				
Hydraulic Reservoir				
Coolant Recovery				
Carrier Wheels				
FILTERS	**Changed**	**Part Numbers**		**Vendor**
Engine Oil				
Primary Fuel				
Secondary Fuel				
Hydraulic Primary				
Hydraulic Secondary				
Transmission				
Transfer Case				
Air Cleaner				
HOSES	**Checked**	**Replaced**	**Part Numbers**	**Vendor**
Upper Radiator				
Lower Radiator				
Heater Hoses				
Steering Hoses				
Blade Hydraulic				
Rear Hydraulic				
BELTS				
Fan Serpentine				
ELECTRICAL				
Front Low Beam				
Front High Beam				
Rear Lights				
Turn Signals				
Hazards				
Front Wipers				
Rear Wipers				
Volt/Amp Meter				
Oil Pressure				
Oil Pressure Buzzer				
Mirror Heaters				
Heater Fan 1&2				
Beacon				
Ether				
Fuel Gauge				
Check Battery				
Battery Posts				
Corrosive Washer				
Battery Water Level				
Comments:				

Page 2				
Drive Sprockets	**Checked**	**Replaced**	**Part Numbers**	**Vendor**
Left Front Inner				
Left Front Outer				
Right Front Inner				
Right Front Outer				
Left Rear Inner				
Left Rear Outer				
Right Rear Inner				
Right Rear Outer				
Carrier Wheels & Seals				
Left Front 1				
2				
3				
4				
5				
Right Front 1				
2				
3				
4				
5				
Left Rear 1				
2				
3				
4				
5				
Right Rear 1				
2				
3				
4				
5				
PINION SEALS				
Front Differential				
Rear Differential				
Transfer Case Yoke Seals				
Front Upper				
Front Lower				
Rear Upper				
Rear Lower				
TRACK TENSION (Check with Supervisor for correct track tension)				
	OK	**Replaced**	**Adjusted To**	
Left Front				
Right Front				
Left Rear				
Right Rear				
Track Condition		**Cracking**	**Separations**	
Left Front				
Right Front				
Left Rear				
Right Rear				
Comments:				

Page 3				
SUSPENSION		**Replaced**	**Part Number**	**Vendor**
Left Front				
Right Front				
Left Rear				
Right Rear				
CHASSIS LUBE	**Greased**	**Replaced**	**Part Number**	
Left Front Journal				
Right Frt. Journal				
Left Rear Journal				
Right Rear Journal				
NOTE: Journals have 2 zerks each and should be greased Yearly only				
Front 5th Wheel (4)				
Rear 5th Wheel (1)				
Trunion Pin (2)				
Rear Pivot (1)				
Front Tie Rod (2)				
Rear Tie Rod (2)				
Mid Actuator (2)				
Front Drive Line (3)				
Rear Drive Line (3)				
Constant Vel (2)				
BRAKES				
Service Brakes				
Parking Brake				
Comments:				