

Evaluation of Parks Canada's Through Highway Management



**Final Report
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**Office of Internal Audit and Evaluation
Parks Canada**

Her Majesty the Queen in Right of Canada, represented by
the Chief Executive Officer of Parks Canada, 2011

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EXECUTIVE SUMMARY

The Agency owns and manages approximately 1,056km of two-lane equivalent national or provincial numbered highways within the boundaries of national parks or national historic sites. Through highways represent about 10% of the estimated \$10.5B replacement value of Agency's asset portfolio and on average approximately 11% of the Agency's direct program expenditures over the last five years. If these assets are not well managed, it could have serious consequences for smaller communities' access to the wider highway system, the efficient and safe flow of traffic within the system, and important environmental consequences for national parks and national historic sites where the highways are located. Given the materiality of the investment in the assets, and the nature of the risks associated with through highways operation, the sub-activity was identified as a high priority for evaluation in both the 2009-2010 and 2010-2011 Parks Canada Evaluation Plans.

Although through highways management is identified as a specific sub-activity in the Agency program activity architecture (PAA), it is not a program in the traditional sense of being centrally funded and managed. Rather, highways are funded, operated and maintained locally by field units, or in one case, regionally, generally as one part of overall assessment management responsibilities.

EVALUATION ISSUES

Consistent with the requirements of the Treasury Board (TB) Policy on Evaluation and associated directives, the evaluation addressed:

1. **Relevance:** Do through highways serve an important need or function, and is management of the highways consistent with constitutional and legal mandates and aligned to overall Agency and government priorities?
2. **Effectiveness:** Has through highways management achieved its performance targets and is it making progress to achieving outcomes?
3. **Cost-Effectiveness:** Is the program efficient and economical in producing outputs and achieving outcomes?
4. **Design and Delivery:** Is through highway management effectively governed and adequately resourced? Are standards applied? Have alternative delivery approaches been considered?

METHODOLOGY

Data from multiple lines of evidence was collected for the evaluation. These included document and file review, a survey of 13 asset managers in field units with responsibilities for through highways, site visits to 13 national parks with highways, interviews with Parks Canada employees (n=67), representatives of other federal departments (n=4), provincial/territorial transportation departments (n=7), police forces of jurisdiction (n=4), and other stakeholders and interested parties (n=26), three case studies and analysis of secondary asset, financial and operational data. Given limitations with secondary data the evaluation relies heavily on document review and qualitative data obtained from interviews and site visits.

FINDINGS

The evaluation found strong evidence that the through highways have important functions within the network of national and provincial highways and are at the aggregate level used by a

substantial number of drivers, although often the functions and uses of the highways are not core to the Agency's mandate and strategic objective. There is a sound constitutional and legislative basis for the federal government and Parks Canada's ownership and oversight of highways within parks and historic sites. The Agency's approach to managing these assets contributes to the Government of Canada's priorities, particularly economic and safety-oriented goals.

Evidence of program effectiveness showed that there is a commonly understood set of core outcomes for the management of highways, including accessibility, efficiency and safety of traffic flow, and minimizing environmental impacts in common with many other managers of highways. There is considerable evidence that relevant activities occur and outputs are produced that support achieving the intended outcomes. Within our limited sample of external stakeholders, little concern was evidenced with respect to the operation and maintenance of highways and their safety relative to adjacent provincial or territorial roads.

There is limited quantifiable evidence that through highways management is effective in achieving, or impacting on, the generally accepted outcomes. The specific case of the TCH twinning project in Banff NP is an exception. Costs of implementing measurement of reach (i.e., traffic counts) and outcomes, lack of technical expertise needed for some measures, lack of demand in the context of day-to-day operational management, and the fact that the Parks Canada is not primarily a transportation agency are all cited as reasons for not developing these kinds of measures.

Agency-wide systematic performance measurement is focused on one output, highway condition, which is a meaningful and important indicator for both management and stakeholders. However, the specific targets related to condition while useful in one case as a public declaration of the minimal level of asset condition the Agency will accept (i.e., 0 days closure due to asset condition), are either not relevant to managers' day-to-day operations of highways or are stated in a way where the intended performance is not clear or measurable (i.e., maintain the condition of 60% of the highways).

The evidence that highways are managed efficiently and economically rests largely on the fact that managers demonstrate an interest in and have implemented many initiatives with the intent of increasing the efficiency and/or economy of highways operations, and the routine use of competitive contracting for major repair and construction projects, which are inherently intended to result in least cost solutions. There is a general sense that efficiency gains and use of low costs options are not serving to compensate for what are relatively static budgets, a concern shared by representatives of provincial/territorial transportation departments interviewed during the evaluation with respect to their own operations.

Quantitative data for judging the efficiency and economy of highway operations is limited in several respects; however, it is useful in demonstrating that efficient highway management is a multidimensional concept and that decision making needs to balance multiple perspectives. At best, efficiency ratios are likely most appropriately used for triggering questions and further investigation rather than as stand along metrics that unambiguously establish whether particular units are more or less efficient or economical than others.

Many aspects of the design and delivery of the through highways management are adequate. Governance structures and processes are understood and supported. Key issues concern the adequacy of resources for achieving the objectives and the need for, and benefits of, setting clear operation and service standards, both from the perspective of managing legal risks and potential for liabilities arising from lawsuits and for informing users and stakeholders of intended levels of service (e.g., snow removal times) or intended quality of outputs (e.g., construction standards). Many issues associated with through highways management are also issues for asset management in general, as documented in the *Evaluation of Parks Canada's Asset Management Program* (2009). Recommendations for the current evaluation were developed so as not to duplicate the recommendations and management action plans resulting from the prior evaluation of asset management.

RECOMMENDATIONS

Recommendation 1:

The Chief Administrative Officer should coordinate, in conjunction with DGs Eastern and Western/Northern Canada, a review of the corporate performance target with respect to maintaining highway condition and ensure it is clear, measurable and monitored.

Response

Agree: The CAO will work with the DGs Eastern and Western/Northern Canada, to develop options for the target. Options proposed for Executive Management Committee decision will address the concerns expressed regarding clarity and measurability. The target options will have a clear and approved definition (consistent throughout the agency), will be measurable and will have an approved measurement methodology (calculation and baseline). The actions will be complete by June 30, 2011.

Recommendation 2:

The DGs Eastern and Western/Northern Canada should, in conjunction with the CFO, ensure that highways belonging to the sub-activity are consistently defined and that expenditures for each through highway are accurately captured in the financial system, consistent with policy requirements that sufficient performance information is available to effectively support the evaluation of programs.

Response

Agree: The DGs Eastern and Western/Northern Canada will seek further direction from the CAO on the definition of the sub-activity to ensure the consistency of coding of expenditures. Once clarification is obtained, the DGs Eastern and Western/Northern Canada will work with the CFO to establish costing guidelines and a coding framework to capture expenditure information for each through highway by June 30, 2011.

Recommendation 3:

The Chief Administrative Officer, in conjunction with the DGs Eastern and Western/Northern Canada, should provide policy, directives, or guidance with respect to operation, maintenance and construction standards for highways.

A nationally consistent approach to standards does not require that the same standard be applied to all highways across the country. Practices already vary by province and in some cases are local where there are challenges in meeting provincial standards. Whatever standards are adopted they should be legally defensible and publicly accessible so that service expectations are clear to users and stakeholders.

Response

Agree: The CAO will work with the DGs Eastern and Western/Northern Canada, to review and update existing policy, directives or guidance pertaining to the operations, maintenance and construction standards for highways for completion by November 30, 2011.

1. INTRODUCTION

Parks Canada's mandate is to:

“Protect and present nationally significant examples of Canada's natural and cultural heritage, and foster public understanding, appreciation and enjoyment in ways that ensure the ecological and commemorative integrity of these places for present and future generations.”

The Agency is responsible for three major heritage systems:

- 42 National Parks of Canada
- 167 National Historic Sites of Canada (administered by the Agency)
- 4 National Marine Conservation Areas of Canada

Parks Canada carries out its mandate through five program activities and twenty sub-activities. The major program activities are **heritage places establishment, heritage resources conservation, public appreciation and understanding, visitor experience**, and the **townsite and throughway infrastructure program**. The focus of the evaluation is on the through highway management sub-activity of the townsite and throughway infrastructure program activity (see Appendix A for Program Activity Architecture - PAA). Parks Canada conducted the evaluation as part of its commitment under the *Treasury Board Evaluation Policy (2009)* to evaluate all direct program spending over a five-year period. Total expenditures on through highways represented an average 11.1% of the Agency's direct program spending over the past five years.

An evaluation of through highways management was identified as a high priority in both the 2009-2010 and 2010-2011 Agency Evaluation Plans, based on considerations of the materiality of expenditures, the extensiveness of the sub-activity reach (i.e., the number of users), and the potential economic, health and safety, and environmental risks if the highways are not adequately managed. The last major management review of roads in general (i.e., the National Roads Strategy) was conducted in 1994. The sub-activity has never been subject to a comprehensive evaluation.

One aspect of the sub-activity, the twinning of the Trans Canada Highway in Banff NP, is scheduled for a separate outcome-focused evaluation in 2014-2015, a TB requirement when authorizing Economic Action Plan funding for completing the last stretch of the project.

2. DESCRIPTION OF SUB-ACTIVITY

2.1 DEFINITION AND INVENTORY

Through highways are national or provincial numbered highways that pass through a national park or national historic site administered by Parks Canada. The Agency has a long history of managing provincial roads in national parks/national historic sites (i.e., responsibility for the majority of these was acquired prior to 1970) and assumed full responsibility for the upgrades and improvements for the Trans Canada Highway (TCH) components within its sites in 1992, when the federal government rescinded the *Trans Canada Highway Act*.

The through highways sub-activity is not a distinct program entity in the traditional sense of being centrally funded and managed; rather, it is a classification of a group of assets, among many others, managed by the Agency. As with townsites in national parks and with certain aspects of the operations of historic canals, the through highway management sub-activity was separated in the Program Activity Architecture (PAA), given both the importance of the assets and the fact that they serve several purposes which are not part of the Agency's core mandate of heritage conservation, visitor experience, and public education.

The inventory of sections of highways included in the scope of the evaluation is shown in Table 1. The standard highway is a paved two lane road, with a third passing or climbing lane in some sections. The table shows information on highway:

- Length (i.e., in case of the TCH in Banff NP which has four lanes rather than two, the kilometre length is doubled so that length always reflects a two lane unit of measure)
- Operator (i.e., whether the Agency staff do operations and maintenance activities or they are contracted)
- Replacement value (i.e., the current cost to replace the asset, a measure of the materiality of the assets, and commonly used in asset management for estimating investment requirements)
- Condition of the road pavement (i.e., based on reports prepared by PWGSC on the Agency's highways, which differ from the condition ratings in the Agency's Asset Management System)

All inventories include a core group of highways (i.e., all of the TCH and close to 600 kilometres of provincial highways) consistent with the definition of a through highway in the Agency's chart of accounts (i.e., a highway which connects communities and passes through national parks and national historic sites). Some inventories also include three additional provincial highways which pass one boundary of a national park but do not directly exit at another boundary, or are gravel rather than paved. These include Highway 5 in Wood Buffalo NP (gravel), Highway 831 in Elk Island NP and Highway 263 in Prince Albert NP, adding more than 180 kilometres. For the purposes of the evaluation, we included all these highways within the scope of the sub-activity although some relevant data on the residual highways, such as expenditures, are not readily available.

Total two-lane length of highways managed by the Agency was estimated at 1,056 km¹ (i.e., approximately 281 kilometres of the TCH in five national parks and more than 775 kilometres of provincial numbered highways in 15 national parks and one national historic site). The total reported acquisition cost of all sections of through highways is \$519M. The estimated replacement value (RV) of the through highways is \$1.08B or about 10% of the total replacement value of the Agency's asset portfolio. Business Units in Western Canada manage the majority of the through highway asset base: 72% of the total length of through highways is located here as well as 71% of the total RV.

¹ The 2009-2010 Departmental Performance Report cites 1,058 kilometres of highways based on small differences in the total length of four highways compared to what is reported in our table.

Table 1: Through Highway Inventory and Description

Field Unit	Park or Site	Highway Number	Name	2- Lane kilometres	Operator	Replacement Value (\$000)	Length in Kilometres by Condition				
							Good	Fair	Poor	Close	NA
East Newfoundland	Terra Nova	TCH		41.8	PCA	46,410	12.2	29.6			
		301	Eastport Road	8.2		6,386			8.2		
		310	Terra Nova Road	3.6		718					3.6
West Newfoundland & Labrador	Gros Morne	430		72.1	Province – Winter	70,900	38.1	22.6	11.4		
		431		29		27,604	5	12.7	11.3		
	L'Anse aux Meadows NHS	436		2.4		1,483			1.1		1.3
Cape Breton	Cape Breton	105	Cabot Trail	80.6	PCA	75,848	21.7	7.4	51.5		
South New Brunswick	Fundy	114		20.6	PCA	22,000		7.6	13		
North New Brunswick	Kouchibouguac	117		23.7	Contractor	16,870			23.7		
Gaspesie	Forillon	132	Laurencelle	10.7	Province	10,800			10.7		
Total East				292.7		279,019	77	79.9	130.9		4.9
% of length by condition							26%	27%	45%	0%	2%
% of replacement value by condition							27%	29%	43%	0%	1%
Riding Mountain	Riding Mountain	10		54.5	PCA	33,856			54.5		
		19		29.3		10,061			29.3		
Northern Prairies	Prince Albert	240	Cookston Road	17.6	PCA	5,468			17.6		
		263		46.9		22,516			46.9		
		264	Eastgate Road	5.8		2,895	5.8				
	Elk Island	831		19.8	PCA	17,500	19.8				
Highway Service Centre	Banff	TCH		142.6	PCA-HSC	198,942	31.1	75.8	35.7		
		11	David Thompson	6		5,900			6		
		93S	Kootenay Parkway	11		12,200			11		
	Jasper	16		76.9	PCA-HSC	93,500		23.8	53.1		
	Kootenay	93S		92.5	PCA-HSC	113,300	17.7	26.37	48.43		
	Yoho	TCH		39.7	PCA-HSC	82,800		11.5	28.2		
	Mount Revelstoke	TCH		13.7	PCA-HSC	25,000	0.3	12.9	0.5		
	Glacier	TCH		43.6	PCA-HSC	79,800	7.6	9.3	26.7		
	Waterton	5	Pincher-Carston	5.95	PCA	3,500	3.45	2.5			
		6	Chief Mountain Highway	22.3		13,200	5.42	16.88			
Coastal B.C.	Pacific Rim	4		21.4	Contractor	18,457		0	21.4		
South NWT	Wood Buffalo	5		114.2	Territory						114.2
Total West				763.75		721,395	91.17	179.05	379.33	0	114.2
% of length by condition							12%	23%	50%	0%	15%
% of replacement value by condition							15%	34%	54%	0%	0%
Grand Total				1,056.45		1,000,414	168.17	258.95	510.23	0	119.1
% of length by condition							16%	25%	48%	0%	11%
% of replacement value by condition							18%	33%	51%	0%	0%

Source: Length and condition: 2007; 2008; 2009 Pavement Management Update; Year of Acquisition & Replacement Value: AMS / SAP
The total length for the TCH in Banff reflects 59.8 kms (doubled) for the twinned portion and 23.1 kms for the non twinned portion.

Snow Shed in Glacier NP

Other Assets: A variety of other infrastructure is also associated with the operation of highways including 118 bridges, 29 buildings, as well as other equipment, grounds, roads and utilities (source: Asset Management System). The accompanying picture shows one associated asset, a snow shed in Glacier National Park, intended to reduce the risk of road closure due to avalanches.

Other important assets serve the sub-activity but are not exclusively allocated to it, including weather stations across parks and radio communication systems. Radio dispatch located in Jasper and

Banff is integral to highways monitoring and emergency response.

2.2 OUTCOMES/GOALS

Consistent with the requirements in the TB *Policy on Management, Resources and Results Structures*, the Agency has identified a limited number of performance expectations and targets for through highways management in its overall Performance Measurement Framework. Up to and including the 2007-2008 fiscal year, these included expectations that through highways: 1) would be open to through traffic, 2) would be maintained in a condition that minimizes risk to users, and 3) environmental impacts of highways would be minimized.

In 2008-2009, the Agency changed its goals for the townsites and throughway infrastructure program and the through highway management sub-activity. At the program activity level, the goal is that “through highways are open to traffic” with a performance target of “0 days of closure of through highways due to asset condition” (i.e., essentially the open objective from the previous framework). For the sub-activity itself, the expected result is that “the condition of through highways is maintained” with the related target that “the condition of 60% of through highways is maintained” (i.e., essentially the “risk to users” objective from the previous framework but with a more specific performance target).

Although the goals were changed at the corporate level, the key concepts of accessibility, efficient and safe transport, and minimizing environmental impacts continue to underlie highway management in the Agency. The objectives are explicit, for example, in several TB submissions (i.e., 2005, 2006, and 2008) seeking funding for the twinning of the TCH in Banff NP and include targets for:

- A reduction in the number of fatal collisions by 40%
- A reduction in the mortality rate for all species by 80%
- Improvement in the understanding of species-specific responses to crossing structures
- A decrease in the travel time along the twinned section (i.e. travel time will be decreased due to reduction in traffic congestion and number of accidents)

These overall goals are widely shared with other managers of highways, as documented in our literature review. The evaluation of highway performance is aligned to these concepts.

2.3 EXPENDITURES

Expenditures on highways have been supported by appropriations, new funding received by the Agency to support asset investments in general (e.g. Budget 2005 funds), and special purpose funding for particular highway projects (e.g. urgent work on the TCH in the Mountain Parks approved in 1992, and emergency and capital repairs to various highways in eastern Canada approved in 2000; extensive funding for twinning the TCH in Banff NP from a variety of sources over the last several years, including most recently \$130M from the Government's Economic Action Plan).

Table 2 shows expenditures directly assigned to the highway sub-activity for the last five years. More detailed breakdowns by business unit and region are shown in Appendix B.

Table 2: O&M and Capital Spending

(000)	2005-06	2006-07	2007-08	2008-09	2009-10
O&M	17,100	20,668	20,831	20,179	19,754
Capital	15,061	45,127	33,176	50,898	93,623
Total	32,161	65,795	54,007	71,077	122,932

Source: PAA Expenditure Reports by Finance Branch²

O&M expenditures have been relatively constant, ranging from \$17M to \$21M, although it should be noted that for a variety of reasons discussed in Appendix B, the total Agency expenditures are likely underestimated. The vast majority of recorded O&M spending occurs at the HSC in Western Canada (e.g., 72% in 2009-2010), which manages 43% of the kilometres of highway under the Agency's control, including the majority (i.e., 85%) of TCH sections.

Capital spending on highways has more than trebled over the same period, largely due to special funding for twinning the TCH at Banff National Park. Highway capital expenditures represented 49% of the Agency's overall capital spending in 2009-2010. Western Canada represents 75% of capital investment in highways in 2009-2010, 99% through the HSC, again reflecting the capital expenditures for the TCH.

2.4 HUMAN RESOURCES, ROLES, AND RESPONSIBILITIES

Table 3 shows the full-time equivalent (FTE) positions allocated to the through highway sub-activity. FTEs represent the aggregate of many positions working part time on the activity. The FTE counts do not include staff time on other relevant activities (e.g., monitoring of environmental impacts). Direct employment on through highways tends to reflect the size of the asset and the traffic it bears, such that field units with more extensive and utilized through highways are more likely to have one or possibly two staff dedicated directly to the sub-activity.

² The figures do not include costs of "corporate" or "internal" services. Adding these costs would increase total expenditures by between approximately \$14M and \$25M per year, with the amount increasing proportional to the sub-activity share of the Agency's overall expenditures (e.g., in theory through highways represented 17% of the Agency spending in 2009-2010 and so would be allocated 17% of the internal service costs). In practice, actual allocations differ from this model, depending on how the Agency is capturing the costs and TBS direction on whether or not to allocate all of these costs for reporting purposes.

For the most part, care of through highways is but one part of the road crew and asset manager's duties.

Table 3: FTEs Associated with Through Highway Management

Year	2004-05	2005-06	2006-07	2007-08	2008-09
FTEs	154.8	147.4	145.4	146.7	154.7

Source: Salary Management System, Finance Branch

The roles, responsibilities and accountabilities for managing through highways are the same in many respects as those for the management of other assets.

At National Office, the Director of Real Property has responsibility for policy, directions and information systems related to asset management in general. The Director, Strategic Planning and Reporting, is responsible for coordinating the development of the performance framework with respect to through highways. Both of these positions report to the Chief Administrative Officer (CAO). The Chief Financial Officer (CFO) is responsible for accounting policies related to assets. Approval of overall policies and directions is the responsibility of the Executive Management Committee, based in some cases on the recommendation of Operations Committee.

Operational responsibility for assets is delegated to the Directors General, Eastern and Western/Northern Canada and through them to business unit managers who are generally Field Unit Superintendents (FUS). The Directors General are supported in their asset management responsibilities by asset advisors and small teams of technical experts.

FUSs are responsible for the operation and maintenance of the highway(s) in their unit for six field units in Eastern Canada and for five field units in Western Canada with through highways. Asset managers and their teams support them in the operation, maintenance and management of all assets, not just the highways. The highways in the Banff, Jasper, Lake Louise / Kootenay / Yoho, Mount Revelstoke and Glacier NPs have been managed regionally since 1994 by the Highway Service Centre (HSC). The HSC is responsible for the operation, maintenance and recapitalization of all highways and roads, solid waste collection, and associated fleet and service garages within and on behalf of Mountain Park Field Units.

Under current Agency policy, field unit managers have authority to approve asset investments up to \$2M and Directors General, Eastern or Western/Northern Canada up to \$10M. Projects over \$10M are submitted for approval to TB.

Most of the asset funding received in Budget 2005 was allocated in approximately equal amounts to the Directors General Eastern and Western/Northern Canada, who allocate the funds based on business cases prepared by FUSs. In contrast, allocation of EAP funding received by the Agency has largely been managed by a national steering committee. Budget 2005 funding was meant to cover all Parks Canada capital expenses, including through highways. As such, business units typically "compete" for highway recapitalization funding against other capital project funding needs (e.g. for visitor facilities or canal-related projects).

2.5 ACTIVITIES/OUTPUTS

Planning and Reporting: Units with highway management responsibilities must identify risks and threats to performance, cost and prioritize interventions, seeking funding external to the unit if required, and plan maintenance and major repair or recapitalization activities. They are responsible for maintaining data on the condition of the assets and inputting this and other relevant information on highways into the AMS and/or SAP financial system.

Highway Operations: Operating activities are performed in the normal course of business. For example, roads are patrolled to detect and remove obstacles to traffic (e.g. large branches, tire strips, and other debris). Crews perform routine road upkeep (e.g. surface cleaning, line of sight tree removal), remove graffiti, and clean and thaw culverts. They are also involved in ditching, flagging, brushing and mowing alongside highways. In winter, they place snow markers, remove snow from roads and apply chemicals and abrasives to manage ice build-up.

Rogers Pass Garage Facility – October 2009



Road crews provide input to support the monitoring of weather and driving conditions, providing this information to radio stations that report conditions. They also respond to emergency situations, providing highway accident response (often being the first to the scene according to unit management), washout control, mud earth and rock slide control, avalanche and flood control response.

Maintenance and Repairs: Maintenance includes inspections to meet legal requirements, inspections to ensure health and safety, work to determine the condition of the asset, preventative maintenance and small repairs (i.e., those under \$10K). The Agency repairs, installs, and/or maintains highway lines and shoulders, curbs, islands, barriers, signage, surface reflectors, guard rails, fences, on ramps, and bridges. Depending on the unit, the Agency also maintains railway-crossings, service equipment (e.g. plows), snow sheds, and flood control assets. The Roger's Pass garage facility and some of the associated equipment on site is pictured above.

Capital Investment: Capital investments serve to acquire a new asset or add to the life or functionality of an existing asset (i.e. recapitalization). Capital projects associated with the sub-activity include twinning segments of highways, adding animal over or under passes, roadside fencing, and other new infrastructure such as culverts, ditches, signs, truck turnarounds and weigh scales.

2.6 STAKEHOLDERS AND PARTNERS

The Agency relies on a variety of partners for delivery of the through highways sub-activity. The most notable of these is PWGSC, which under Treasury Board Common Service Policy is responsible for contracting and managing most projects over \$400K, and provides analysis of

highway pavement condition and investment requirements. A significant exception to the use of the Common Service Policy was provided as part of TB approval of the most recent funding for twinning the TCH in Banff NP. With temporary funding provided under the Gateway and Border Crossing Fund and Budget 2009, the Agency was granted authority to enter into competitive construction and related goods and services contracts valued at up to \$50M, to amend these contracts by up to \$5M, to enter into architectural and engineering contracts valued at up to \$5M and amend these contracts by up to \$500K.

Other partnerships include for example, the HSC's arrangement with the Department of Defence for avalanche control services in Mount Revelstoke/Glacier NPs and the sharing of heavy equipment for O&M in the area, and the agreements explored in the case studies with provincial/territorial governments who provide the operations and maintenance of specific highways.

The range of highway stakeholders is illustrated by the composition of the advisory panel for the TCH twinning project in Banff NP. The twelve member advisory committee includes representatives of park users associations, Aboriginal groups, environmental NGOs, transportation industry and associations, the RCMP, chambers of commerce, townsites, and the Province of Alberta.

2.7 THROUGH HIGHWAY MANAGEMENT LOGIC MODEL

A logic model showing the relationships between inputs (i.e., the assets, human resources, expenditures), with activities/outputs and reach, and intermediate and long-term outcomes is shown in Table 4. It provides a visual summary of the program description.

Table 4: Logic Model for Through Highway Management

Long-Term Outcomes	<ul style="list-style-type: none"> - Canadians have a strong sense of connection, through meaningful experiences, to their national parks, national historic sites, and national marine conservation areas - Protected places are enjoyed in ways that leave them unimpaired for present and future generations 			
Intermediate Outcomes	<ul style="list-style-type: none"> - Through highways are open to traffic - Condition of the highways is maintained - Through highways are safer, traffic flow is efficient - Environmental impacts of through highways are minimized 			
Reach	Clients: Parks visitors Drivers passing through parks Commercial users		Service Delivery Partners: Provinces/Territories PWGSC Department of Defence Contractors	Stakeholders / interested parties: Aboriginal groups and communities Other Federal Departments, Provinces Municipalities Industry / associations Other service providers (police of jurisdiction)
Outputs	<ul style="list-style-type: none"> - Risk assessments - Environmental assessments and mitigating strategies - Project proposals and plans - Project budgets 	<ul style="list-style-type: none"> - Hours of patrol - Segments of road or infrastructure cleaned or cleared, salt applied etc. - Highway condition maintained 	<ul style="list-style-type: none"> - Condition of assets maintained (e.g., repairs and patches) - Assets (guard rails replaced) - Rock faces fortified - Work sites rehabilitated 	<ul style="list-style-type: none"> - Asset added or improved function/life (e.g., road segments, lanes, drains, retaining walls, rumble strips, signage, animal over/under crossing structures & fencing)
Activities	<ul style="list-style-type: none"> - Conduct risk assessment - Identify future projects and prioritize - Conduct environmental assessments - Contract support where needed 	<ul style="list-style-type: none"> - Engage in road patrol - Surface cleaning, snow removal, etc. - Respond to emergencies 	<ul style="list-style-type: none"> - Repair / maintain highways and infrastructure - Rehabilitate gravel excavation sites and spill clean-up 	<ul style="list-style-type: none"> - Design, construct or oversee the construction of new highway segments and associated infrastructure
Inputs	<ul style="list-style-type: none"> - Parks Canada Staff: +/- 150 FTEs - Budgets: \$32 to \$123M per year over last five years - Assets: 1,056 km of highways, additional associated assets including bridges, buildings, equipment, grounds 			

3. EVALUATION DESIGN

3.1 EVALUATION PURPOSE AND SCOPE

The evaluation examined the relevance, performance (e.g. effectiveness, efficiency, and economy) and design and delivery model of the sub-activity consistent with the requirements of the TB Evaluation Policy (2009). The scope includes through highways as defined in the Agency's program activity architecture and does not cover other roads managed by the Agency, even though both type of roads sometimes share the same set of resources (i.e., O&M budgets, staff, and equipment) as well as similar issues and challenges. Parks Canada Agency evaluation staff conducted the evaluation between August 2009 and May 2010.

3.2 APPROACH AND QUESTIONS

The evaluation employed a cross-sectional multiple mixed methods approach to address the evaluation questions. The questions were originally set out in the approved (i.e., July 9, 2009) *Framework for the Evaluation of the Through Highways Program*. There were ten specific questions and 17 associated expectations, adapted from the original framework, related to the three overall issues of relevance, performance and program design. The key questions are shown in Table 5. A more detailed matrix of questions, what we expected to observe, indicators and relevant data sources is found in Appendix C.

Table 5: Evaluation Questions

Relevance	
1.	Is there a continuing need for the highways?
2.	Is there a constitutional and legal basis for the federal government and Agency in the operations of highways?
3.	To what extent is the ownership and operation of highways aligned with Parks Canada's mandate and objectives and with overall government priorities?
Performance	
4.	To what extent are the expected activities occurring and the anticipated outputs being produced?
5.	Are performance targets for activities or outputs important to managers and stakeholders, logically related to outcomes and achieved?
6.	To what extent are expected outcomes (i.e., efficient and safe traffic flow and minimizing environmental impacts) being achieved?
7.	To what extent is through highway management efficient in producing outputs and economical in producing outcomes?
Program Design	
8.	Are the governance structures, processes, and resources for highway management appropriate and adequate to achieve the desired outputs and outcomes?
9.	To what extent are activities and outputs guided by and in conformance with relevant standards?
10.	Are there reasonable and practical alternative delivery models for through highways management?

3.2.1. Methods

Data collection methods are summarized below.

Document and File Review	A wide variety of documents including legislation, policy, plans, reports, and published literature were reviewed for the evaluation (see Appendix D for a list).
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Survey of Asset Managers	<p>A survey was conducted of asset managers in the 13 management units responsible for one or more through highways. It was intended to validate information gathered from other documents (e.g., highway length, condition, and expenditures), gather additional factual information (i.e., what policies and/or standards governed highway management, local performance expectations, delivery models) and identify potential stakeholders for key informant interviews. The survey was conducted prior to the site visits. Twelve of the 13 units surveyed responded.</p>
Site Visits and Direct Observation	<p>Between October and December 2010, we visited 13 of the 18 national parks where highways are located (i.e., Terra Nova, Gros Morne, Cape Breton Highlands, Forillon, Riding Mountain, Banff, Kootenay, Yoho, Jasper, Mount Revelstoke, Glacier, Waterton Lakes, and Wood Buffalo). The sites were selected based on six criteria: regional representation, materiality (i.e. upkeep expenditures and replacement value), length, level of park visitation, risk (i.e. asset condition), and management model. The evaluators drove more than 850 kilometres of through highways (i.e., about 77% of the total length) observing highways, traffic levels, and related infrastructure. We also visited the Office of the DG Eastern Canada, the HSC and the Atlantic Service Centre.</p>
Key Information Interview	<p>Key informants included:</p> <ul style="list-style-type: none"> • 67 Parks Canada employees (i.e., 6 in National Office, 7 with the Offices of DGs Eastern or Western/Northern Canada or in service centres, and 54 field unit personnel) • 4 representatives of other federal departments (PWGSC, Transport Canada, and Public-Private Partnerships Canada) • 9 representatives of Provincial or Territorial Transportation Agencies (i.e., directors or regional or operations managers of BC, Alberta, NWT, Manitoba, Quebec, Nova Scotia, Newfoundland) • 4 representatives of police forces of jurisdiction (e.g., RCMP in three jurisdictions and the Sureté du Québec) • 26 representatives of other external stakeholders or interested parties (i.e., Aboriginal communities, transportation industries and associations, tourism and hospitality industries, cooperating associations, non-governmental organizations, and municipalities and townsites served by through highways) <p>Fifteen of the 110 interviews were conducted by phone; the others were in-person often connected with the site visits.</p>
Case Studies	<p>Three cases studies were conducted to explore, in more detail, situations where alternative service delivery models were employed, either through contracting of highway operation and maintenance in Forillon and Wood Buffalo NPs, or regional delivery of the highway management through the HSC. Details of each case are provided in an Annex to this report.</p>

Analysis of Secondary Data We relied on the Agency's financial system, the asset management system (AMS), and the occurrence tracking system (OTS) (i.e., used for monitoring and reporting of public safety, compliance and law enforcement incidents and human interactions with wildlife species) and managers' local data on highway traffic volumes to describe the sub-activity and address specific evaluation questions and indicators. We requested data on highway expenditures from representatives of provincial and territorial governments to compare delivery costs but were unable to obtain it due either to lack of availability or sensitivities about sharing the information.

3.2.2. Strengths and Limitations

Through the document and file review, interviews, site visits and case studies, we gained an extensive understanding of highway operations and the nature of the issues and challenges faced by managers. We were also able to collect some quantitative information not available in national systems, such as traffic counts. Our key informant interviews within Parks Canada were extensive and can be considered representative of current opinions and perceptions within the Agency. Similarly, we were able to interview several representatives of transportation agencies at the provincial and territorial level and their views of the Agency's highway operations are well represented. While we only interviewed representatives of three other federal departments and Agencies, these are the key organizations relevant to the Agency's highways operations.

Representatives of police forces of jurisdiction and other stakeholders and interest parties were largely identified by Parks Canada managers (i.e., through the survey of managers and site visits and interviews), and as such are a sample of convenience rather than a random sample from the relevant populations. They do not necessarily provide a comprehensive or representative picture of the views of these groups. Given time and resource limitations we were not able to compensate for this limitation.

With respect to secondary data, we were able to rely on pavement condition data from PWGSC Pavement Management Updates (PMU), an important indicator for assessing performance. PMU reports are generally completed every three years and provide a rating of pavement sections on a scale of 0 to 100 (i.e., the Pavement Condition Index or PCI). A rating of 68 or more represents good condition, between 60 and 68 is considered fair condition, and less than 60 is poor condition. As PCI ratings were available for the same highways at different points in time, we were able to assess changes over time. As well, the reports provide estimates of costs to improve condition ratings, which were useful in addressing questions about the adequacy of resources and likelihood of future condition improvement or deterioration.

In general though, secondary data available in the Agency was of limited use in addressing the core evaluation questions and indicators. In particular, aggregate expenditure data by management unit is inconsistent (see Appendix B), is not easily assigned to particular highways (i.e., where a unit manages more than one highway) and not consistently linked to standard activities or outputs (i.e. salt, sand, fuel spent on highways) across the system.³ In addition,

³ In some cases, assigning expenditures to through highways is based on rules of thumb rather than precise accounting (i.e., estimating what portion of costs to assign to through highway verses internal roads when trucks pass from one to the other while clearing snow, or spreading salt and sand). The rules of thumb differ between

quantitative data with respect to activities (e.g., number of hours of road patrols) or specific outputs (e.g., frequency of highway inspections), with the exception of data on highway condition, is largely absent. Together, this limited our ability to rigorously address questions of efficiency and economy.

Other secondary data exists and is available (i.e., traffic volumes, counts of accidents, counts of wildlife injury and mortality related to vehicle collisions) but is often incomplete, although it was of some use for addressing the core evaluation questions related to the efficiency and safety of traffic flow and the environmental impacts of highways. An exception to this is the generally high quality data that exists for some outcome indicators for the TCH in Banff NP.

It is well beyond the scope of the evaluation to develop new primary data or conduct the kind of detailed transaction analysis that would be required to mitigate the impacts of the missing or inconsistent secondary data (e.g., new measures of volume, types of accidents, identification of costs attributable to individual highways). Therefore, the evaluation relies heavily on the analysis of literature, documents and records, and qualitative data obtained from key informant interviews and site visits. Where available, the analysis is supplemented by quantitative data.

management units. Estimation in these cases is a reasonable management response to the realities of operations in the field, and does not in our view pose a significant limitation to determining costs of the sub-activity.

4. EVALUATION FINDINGS

4.1 RELEVANCE

Question 1	Indicators
Is there a continuing need for the highways?	<ul style="list-style-type: none"> Level of use (vehicle traffic) Extent highways provide important social and/or economic benefits

Expectation: Highways are used and/or have important functional roles in the transportation network

An approximation of the level of demand for the through highways segments managed by the Agency is shown in Table 6. The table also shows the number of person-visits recorded for each national park for 2008-2009.

Traffic volume data was available for 14 of 28 (i.e., 50%) of inventory of highways. Total traffic volume for these highways is approximately 15 million vehicles. This underestimates the true extent of aggregate annual demand, although it is difficult to say by how much, given that traffic volume data was not available for some highways and some of those for which it was available only count traffic for certain parts of the year (i.e., the main operating or high season). The majority of the traffic volume (84%) shown in the table occurs in the sections of the highway in the Mountain Parks managed by the HSC.

Table 6: Estimated Travel Volume and Persons Visits for Selected Parks with Through Highways

Park	Road	Volume (in cars, for latest year available)	2008-09 Park Attendance (in persons)
Terra Nova NP	TCH	>600,000 (5 months)	259,079
Gros Morne NP	430	>200,000 (5 months)	134,292
Fundy NP	114	>200,000 (Y)	255,456
Kouchibouguac NP	117	>200,000 (Y)	146,736
Forillon NP	132	>300,000 (6 months)	127,269
Riding Mountain NP	10	>550,000 (6 months)	249,493
Elk Island NP	831	>70,000 (Y)	198,231
Banff NP	TCH	>6,250,000 (Y)	3,114,535
Jasper NP	16	>1,400,000 (Y)	1,867,058
Kootenay NP	93S	>1,200,000 (Y)	421,096
Yoho NP	TCH	>1,900,000 (Y)	543,424
Mount Revelstoke / Glacier NP	TCH	>1,700,000 (Y)	603,699
Waterton Lakes NP	6	>200,000 (Y)	373,257
Wood Buffalo NP	5	> 45,000 (Y)	975
Total		>14,815,000	8,294,600

Estimates of traffic volume during the main operating season cannot be extrapolated to the rest of the year.

Sources: On volume – Various sources provided by NPs; Attendance – Parks Canada Attendance Data 2004-2009.

Parks attendance provides a useful comparator since it shows that volumes, as measured in number of vehicles for a given period, often exceed the number of visits to the national park where the highway is located. This highlights the fact that highways typically serve other functions than access to Parks Canada sites.

Highways managed by the Agency provide:

- **The only road access** for several communities including Fort Smith east of Wood Buffalo NP; Tofino north west of Pacific Rim NPR; communities such Neils Harbour and Pleasant

Bay north of Cape Breton Highlands NP; Terra Nova and Eastport located in the vicinity of Terra Nova NP; and the many communities north of Gros Morne NP in Newfoundland.

- **Major road access** for several communities including near Forillon NP (Cap-aux-Rosiers), Fundy NP (Alma), Kouchibouguac NP (Pointe-Sapin), Riding Mountain NP (Wasagaming and Dauphin) which provide important feeder routes to the main highway network.
- **Major transportation corridors** as part of the National Highway System (NHS).⁴ Approximately 40% of the Agency's through highways form part of the NHS, and by definition are deemed to provide key highway linkages that are vital to both the economy and the mobility of Canadians. The relevant highways are shown in Table 7.

Table 7: Agency Highways Segments Included in the National Highway System

Park or Site	Highway Number	Length (kilometres)		
		Core	Feeder	Total
Terra Nova	TCH	41.8		
Gros Morne	430		72.1	
Banff	TCH	142.6		
Jasper	16	76.9		
Yoho	TCH	39.7		
Mount Revelstoke	TCH	13.7		
Glacier	TCH	43.6		
Total kilometres		358.3	72.1	430.4
Percent of total through highways length		33.9%	6.8%	40.7%

In short, there are varying levels of demand for each of the highways managed by the Agency, sometimes extensive demand, and often for purposes other than visiting national parks or national historic sites.

Question 2	Indicators
Is there a constitutional and legal basis for a federal role in the operations of highways?	Extent constitutional separation of powers and laws authorize the federal government to operate highways and defines a role for Parks Canada in highways within its sites

Expectation: There is a constitutional and legal basis for a federal government role in the operation of highways

Under the *Constitution Act* (1867), highways are considered “Local Works and Undertakings” and are the responsibility of the provinces and territories.

Consequently, the vast majority of the 1.4 million two-lane equivalent kilometres of roads in Canada are owned and managed by the provincial or territorial governments.

The federal government's role in highways has, therefore, largely focused on co-funding highway investments, beginning in 1919 with funding provided to support the *Canada Highways Act*, with a view to increasing system efficiency and consistency, enhancing the national

⁴ The National Highway System, established in 1988, is a network of key inter-provincial and international highway linkages deemed vital to both the economy and to the mobility of Canadians. Over 95 percent of the NHS is owned and operated by provincial authorities. NHS roads under federal control (mostly roads through national parks and the Alaska Highway) account for about 3 percent of the NHS network and roads under municipal control account for about 2 percent.

economy, increasing tourism, and reducing unemployment (see Appendix D for relevant sources). In 1992, the TCH Act was repealed, given that the TCH was completed.

Although the *Constitution Act* (1867) generally gives provinces jurisdiction over highways, there are exceptions related to all matters concerning the military and defence as well as “Indians, and Lands reserved for the Indians.”⁵ This authority extends to highways and roads within the boundaries of lands set aside for these purposes. Therefore, the federal government retains management of some highways and roads that pass through federal lands (e.g. parks, military bases, and National Capital Commission lands) as well as those passing through Aboriginal reserves.

Expectations: Legislation sets out legal authority and responsibilities for Parks Canada’s ownership and operation of highways.

Parks Canada’s management of highways running through its parks derives from its legislative authority, as set out in the *Canada National Parks Act* (2000). The Agency operates sections of highways in national parks

because they are located on federal land within park boundaries set out in Schedule I of the Act. As stipulated in the Act, the Governor in Council retains the right to make regulations on the establishment, maintenance, administration, and use of highways, and the circumstances under which they must be open or may be closed to the public. The Act states further that the establishment or use of highways does not operate to withdraw lands from a park. As a consequence of the repeal of the TCH Act in 1992, Parks Canada assumed the responsibility for the recapitalization of its existing infrastructure although the Government of Canada as a whole has assumed responsibility to fund major expansions and improvements (e.g., significant funding over several years to support twinning of the TCH in Banff National Park).

Question 3	Indicators
To what extent is the ownership and operation of highways aligned with Parks Canada’s mandate and objectives and with overall government priorities?	<ul style="list-style-type: none"> Extent the goals and objectives of the highway program are consistent with the whole of government framework and Parks Canada mandate and priorities

Expectation: Ownership and operation of the highway is linked to the Agency’s mandate and strategic outcome

There is nothing in the Agency’s mandate (see page 1) or its strategic objective shown in the text box that logically requires the Agency to own and operate the through highways within its sites. As noted previously, through

highway management was deliberately identified as a distinct sub-activity in the Agency’s PAA in part because the ownership and operation of these assets is not seen as core to delivering on the Agency’s mandate. Analysis conducted for the 1994 National Road Strategy estimated that 65% of the total cost of maintaining and improvement roads in general was unrelated to the Agency’s mandate (i.e., essentially the costs of the through highways component of roads was identified as unrelated to the mandate).

Agency Strategic Objective

Canadians have a strong sense of connection, through meaningful experiences, to their national parks, national historic sites and national marine conservation areas and these protected places are enjoyed in ways that leave them unimpaired for present and future generations.

⁵ *Constitution Act*, 1867., VI, s.91 7 and 24

Although not logically related to the mandate or strategic objective, the vast majority of the key informants within the Agency did note that given the existence of these assets within national park or historic site boundaries, it was important that the Agency have an oversight role in their operation to ensure they supported the Agency's core objectives related to conservation and enjoyment of heritage places. There was little objection to having third parties perform the actual management and maintenance activities associated with highways.

Expectation: Highways are operated in a manner that contributes to the whole of government priorities

Given its management and operation of highways, the approach the Agency has taken to its responsibilities is logically related to the wider federal government priorities expressed in the Whole of Government Framework.⁶

There is a strong link, for example, between through highway management and the government's priority of Strong Economic Growth. This outcome seeks to increase economic growth and development in all regions and all sectors of the economy and makes specific mention of improving transportation systems and corridors and building and strengthening physical infrastructure. How this is to be done is not prescribed but the Agency's activities related to maintaining highway condition clearly support this goal, particularly as about 40% of through highways are segments of the NHS. Budget 2009 included funding specifically for the twinning of segments of the Trans-Canada highway within Banff National Park "to increase passenger safety and ease traffic flows."⁷

Additionally, although less directly, the Agency's focus on the condition, design and management of highway infrastructure links to the Government of Canada's Safe and Secure Communities outcome. Managing environmental impacts of highways aligns with the A Clean and Healthy Environment outcome, given a number of potentially negative impacts are inherent in having a highway pass through a park, such as wildlife mortality, habitat fragmentation, and potential damage from chemical runoff. Through highways, by providing access to National Parks, also contribute to Canadians experiencing and understanding a Vibrant Canadian Culture and Heritage.

OVERALL FINDING: RELEVANCE

The through highways continue to be relevant. This is demonstrated by evidence showing the continuing and important need for the highway segments managed by the Agency, including varying but significant levels of use and the fact the highways serve social and economic functions for otherwise isolated communities, greatly simplifying access to communities, or as integral components of the national highways system.

There is a legitimate constitutional and legal basis for the federal government's role in the ownership and operations of specific highways and a legal basis for Parks Canada's ownership of the sections of highway within the boundaries of its sites. Ownership and operation of highways is not logically related to, or required, either to advance the Agency's core mandate or current strategic objective. However, given ownership of these assets, the manner in which the Agency approaches highway management is aligned with overall government wide priorities.

⁶ <http://www.tbs-sct.gc.ca/ppg-cpr/frame-cadre-eng.aspx>

⁷ Budget 2009: Canada's Economic Action Plan, January 27, 2009

4.2 EFFECTIVENESS

This section of the report is sub-divided into two parts, the first focusing on activities, outputs and associated targets and the second focusing on evidence of achievement of intermediate outcomes. Examples of best practices are illustrated throughout the section.

4.2.1. Activities and Outputs

Question 4	Indicators
To what extent are the expected activities occurring and the anticipated outputs being produced?	<ul style="list-style-type: none"> • Reported extent of activities and outputs • Perceptions of the adequacy and/or quality of the operating and maintenance activities • Logic links between activities, outputs and outcomes • Statistics showing level of effort invested in specific activities or the nature or quantity, or quality of outputs produced

Expectation: Expected operating and maintenance activities occur, outputs are produced and both are logically related to the intended outcomes for the program

A wide array of specific activities and outputs are involved in operating and maintaining highways as reviewed in the logic model (Table 4) and program description section of this report. Through interviews and on site observation, we heard about or observed

many of these activities and outputs. Direct observation of highways driven by the evaluators confirms that, for example, roads were clear and, when and where necessary, salted and/or sanded.

The majority of public users and vested stakeholders indicated that, in their view, the highways are well operated and maintained in the winter. Provincial transportation representatives interviewed for the evaluation indicated that the Agency provides adequate to good operation and maintenance of the through highways segments in their region (see best practice in measuring quality of operations).

All of the activities and outputs identified in the course of the evaluation are logically related to one or more of the explicit or implicit outcomes of accessibility, efficient and safe traffic flow, and minimizing environmental impacts of highways. For example, various kinds of hazard analysis including rock fall potential, identification of hazardous trees, analysis of slope stability, identification of avalanche hazards, and flooding analysis are undertaken to ensure access, efficient traffic flow and safety. Hazard analysis in turn leads to many activities and outputs aimed at mitigating the effects of these potential hazards. Some examples include implementing reduced speed zones in areas of high animal traffic or for reasons of geography, clearing brush to ensure a clear line of sight, increasing signage, and implementing various avalanche control measures. More costly

Best Practice: Measuring Quality of Operations and Maintenance

The BC Government, where highway service delivery is largely contracted to the private sector, measures quality of road maintenance activities such as snow removal, mowing, patching and sign maintenance through local and regional audits and ratings of stakeholders' satisfaction provided by the RCMP, emergency response providers, trucking firms and bus lines in particular service areas. The government has a target of 92.5% quality rating.

Source: 2008/09–2010/11 Service Plan Ministry of Transportation
<http://www.bcbudget.gov.bc.ca/2008/sp/trans/default.html#4>

interventions include twinning of the TCH at Banff and constructing passing lanes or pull-offs for sightseeing which is explicitly intended to promote safety and reduce vehicle incidents.

Managers were also able to describe and provide documentation related to many initiatives and activities for managing the environmental impacts of highways, including:

- Conducting work with other federal and provincial entities (provincial insurance boards) to create awareness campaigns and increase the quantity of road signs in known animal hot spots, for example in Wood Buffalo, to remind people to drive safely and watch for the bison.
- Designing and incorporating features to allow fish to pass safely through culverts (i.e., pipes connecting water sources on either side of a highway that are meant to evacuate the largest volume of water, as quickly as possible). Culverts are detrimental to fish habitat connectivity but have been designed or modified in some parks to allow safe passage. These features can add a cost of between 5% and 15% of the total project cost.
- Safeguarding beavers while preventing their dams from flooding parking lots and roads (i.e., Forillon NP). The initiative consisted of building structures resembling dams that allowed beavers to continue their work with no impacts on the road. The initiative resulted in the Province seeking Parks Canada's assistance and expertise in handling its own issues with managing beavers and their habitat.
- The construction of animals under and over structures in Banff National Park, and fencing sections of the highway, intended to reduce the traffic related mortality of large mammals on the TCH.
- Efforts to reduce use of road salts, which can damage the environment (i.e., the left picture below shows one negative impact of salt use where wildlife is attracted to the highway, increasing the risks of animal mortality). Initiatives to reduce salt use include mechanical ploughing rather than applying salt in winter, applying potash or using a mix of sand and salt instead of using pure salt, or using a brine mixture (liquid and salt), acquiring equipment with global positioning systems and temperature tracking capability that allows a more efficient spread of the salt where the conditions warrant it, and finally mitigating the risks associated with salt storage by converting from open air to covered closed storage facilities.

Left: Bighorn Sheep licking the road salts off the Yellowhead Highway in Jasper NP

Right: Bison wandering close to the highway on Wood Buffalo NP.



Question 5	Indicators
Are performance targets for activities or outputs important to managers and stakeholders, logically related to outcomes and achieved?	<ul style="list-style-type: none"> • Logical relations between performance measures and outcomes • Extent measures and targets are seen to be meaningful and useful • Number of day of highway closure due to asset condition • Highway pavement condition ratings over time

Expectation: Performance targets are clear, meaningful, and intended levels of performance are achieved.

The Agency has two performance expectations and targets for through highway management in its PMF (i.e., 0 days of closure due to asset condition, and that 60% of highway condition is maintained). These are not direct measures of outcomes but rather were deliberately designed to measure outputs (i.e., both targets focus on the condition of the highway assets which, barring budget limitations, is directly under the Agency's control).⁸

The distinction between measuring condition as an output and measuring outcomes such as efficiency and safety of traffic flow is widely recognized in our key informant interviews. Managers are able to identify many factors under the Agency's influence but not control (e.g., driver behaviour, vehicle condition, mix of slower tourist traffic versus faster commuter and truck traffic, traffic levels, weather, and animal incursions). These factors impact on whether the outcomes are achieved.⁹ A desire to focus on the controllable aspects of highway operations, and resistance to being accountable for uncontrollable factors, has largely driven the Agency's choice of performance targets for through highway operations.

Highway condition (i.e., condition of the pavement and/or the road bed) itself is not static and will inevitably decline with use. The rate of decline is influenced by a number of factors, including climate conditions, volume of traffic, and the nature of the traffic (e.g., it is reported that the number of high speed multi-axle heavy trucks using a highway will cause more wear and tear and lead to decreased condition). Effective management of highways, either to avoid road closures or to maintain a given highway condition profile, needs to take these factors into account when planning and implementing compensating maintenance and/or recapitalization activities.

Although output focused, both targets are logically related to the outcomes of interest since in the first case, highways must be open in order to provide for efficient traffic flow and the condition of the highways is an important influence on both the efficiency and safety of the traffic flow.

The condition of the Agency's highways is of significant interest to highway managers in provincial or territorial transportation departments and also among the limited sample of

⁸ See TBS Results-Based Management Lexicon, <http://www.tbs-sct.gc.ca/cee/pubs/lex-eng.asp> for definitions of outputs and outcomes

⁹ Driver speeding is an example where the Agency has limited influence, as the Agency does not control or directly influence enforcement of highway traffic laws i.e., this is the responsibility of police forces of jurisdiction. Both Agency staff and members of the RCMP interviewed for the evaluation suggested that, especially in remote locations, the police of jurisdiction do not have sufficient capacity to patrol and enforce regulations on the highways. In addition, the police have other enforcement priorities that will pre-empt routine road patrol. Stakeholders and Agency personnel remarked on the modest level of enforcement of highway laws and regulations within parks

stakeholders and interested parties interviewed for the evaluation. Virtually all stakeholders and many staff indicated a strong preference that the Agency maintains its highways at the same level as the adjacent provincially managed section and that there would be a seamless highway condition regardless of which level of government owns and/or manages the highway. In certain units, the poor condition of the highway pavement is a source of contention with other jurisdictions.

The condition of the pavement and/or road bed is only one aspect of highway assets condition relevant to efficient and safe traffic flow. As one key informant pointed out, the highway system is only as strong as its weakest link. Failure of a single key bridge, culvert or under or overpass on the TCH could impact on the movement of thousands of vehicles over hundreds of kilometres and/or pose significant health and safety risks.

Bridges, (and dams on historic canals) in particular have been identified as high risk assets by the Agency, which has lead to new policy and directives (e.g., Directive for the Design, Construction and Inspection of Vehicle and Pedestrian Bridges, 2000) and efforts to inventory and monitor these assets. In Western Canada, 98 bridges and culverts associated with the TCH or provincial highways are identified, of which 27% are in good condition, 40% in fair condition, 33% in poor condition and one structure is closed due to poor condition.

As there is no target profile for key aspects of high-risk infrastructure, the significance of this data for judging effectiveness of through highway management is not clear.

Achievement of Targets: Since 2000, the Agency has consistently met its target of 0 days of closure due to asset condition, based on self reports of field units to National Office and reported annually in the Departmental Performance Report (DPR). The information in the DPR is reviewed annually by the Office of the Auditor General, who provides negative assurance that nothing has come to their attention during the course of the review that would impact on the fairness and reliability of the information presented. We also did some limited testing of data supporting managers' self reports (i.e., all Banff NP's dispatch records of authorized road closures available since 2004) and found no evidence to dispute this claim.

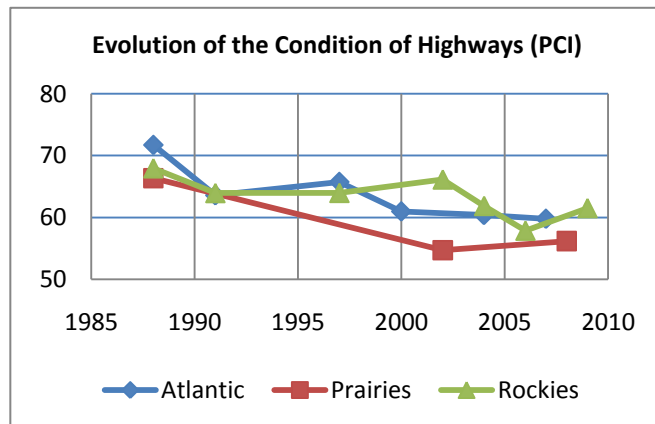
As well, according to some key informants, it is highly likely the Agency will continue to meet the target of 0 days of closure in the future (i.e., condition will not be allowed to deteriorate to the point where a highway has to close as a result of its condition). In effect then, the target serves as a public declaration of the Agency's minimal performance standard for highway condition. The Agency is however prepared to accept that not all highways will be maintained in good or fair condition as implied by its second condition target.

While the second performance expectation for highways is clear in its intent (i.e., maintaining rather than improving highway condition over time), the targeted level of performance is not clear. Key informant interviews with highways managers in the field showed that while most were familiar with the target, there was wide spread confusion and uncertainty on:

- Whether the target should be applied to a single highway, all highways within a particular field unit, to a region, or all the Agency's highways as a whole;
- What baseline year was to be used in judging whether condition is being maintained; and

- What exactly maintaining 60% of the asset condition meant (i.e., it is often but not always interpreted to mean 60% of the highway length is maintained in good condition).¹⁰

An example of a measurable target for highway condition was reported by one field unit in its performance template completed as part of the 2009-2010 business planning cycle (i.e., maintain 70% of through highways in fair to good condition).



The Agency has sufficient information on highway pavement condition (from PWGSC PCI measures), including the ability to track changes in condition over time for some highways. In theory the Agency can report on whether and to what extent the condition is being maintained but has not done so in the past. A summary of this information, compiled for the evaluation, is shown in the accompanying graph.¹¹

The most recent weighted average of the pavement condition index in the graph (across all three regions) is 59.96, which is right on the boundary between a fair (60 or greater) or poor (59 or less) condition rating.

The trend in pavement condition is clearly downward although there are exceptions such as the improvement in overall condition in the Prairies region¹² largely due to the recapitalization of the Elk Island Parkway in 2009, which raised its PCI from 32 in 2004 to 79.

Other improvements are likely, given the recent funding through the Government's Economic Action Plan, some of which is allocated to specific through highway projects. This includes \$14M over two years for the Cabot Trail in Cape Breton Highlands NP, \$4.6M on highway 93S in Kootenay NP, approximately \$1.9M on highway 6 in Waterton Lakes NP, and almost \$850K on highway 16 in Jasper NP. While the investments will create some short or medium term improvements in the condition of these highways, it is doubtful that improved condition can be sustained in the longer term given future investment requirements and capital budgets (see discussion below on program design).

¹⁰ Other complications were apparent as well. For example, one asset manager noted that he would consider the target met or not met in his field unit depending on whether the condition assessment referred to the pavement surface or to the surface and the road bed.

¹¹ Multiple measures of condition, over 20 years, were available for seven highways in the Atlantic region representing 274.4km, two highways in the Prairies totalling 120.1 km and six highways in the Rockies totalling 412.9km, or approximately 80% of the highway length shown in Table 1. We created a weighted average pavement condition index across all the highways within each region. Creating a weighted average allows the overall condition to be expressed as a single number rather than as a profile.

¹² The Prairies region for the PMU includes highways in Prince Albert, Elk Island, and Riding Mountain NPs.

4.2.2. Outcomes

Question 7	Indicators
To what extent are the expected outcomes (i.e., efficient and safe traffic flow and minimizing environmental impacts) being achieved?	<ul style="list-style-type: none"> • Extent of common understanding of goals and objectives of highway sub-activity • Stakeholder perceptions of the extent to which highways are accessible, efficient, safe and minimizing environmental impacts • Number of highway accidents and vehicle wildlife collisions over time • Measures of efficient transport (e.g., vehicle volume by kilometre), safety (e.g., vehicle incidents by length) or environmental impacts (e.g., vehicle wildlife conflicts)

Expectation: Managers share a common understanding of intended outcomes in highway management.

Concerns with accessibility, efficiency and safety of highways, and minimizing environmental impacts are wide spread and pervasive in the Agency, as demonstrated by many documents (e.g., management plans, reports, TB funding submissions), interviews and site visits. In the survey of field unit asset managers, more than 90% reported the existence of local performance expectations related to the safety and environmental impacts of highways; although, the content of the expectations is often vague (e.g., “to provide safe passage for all,” “as per the Canadian Labour Code”, and “address critical issues and maintain safe highways”; or “environmental assessments for all works”, “minimizing any impact to the environment through various measures”, “manage in an environmentally sustainable manner”, and “follow salt management plan”).

Expectation: Stakeholders report that the Agency is providing accessible, efficient, safe operations and that environmental impacts are minimized.

None of the stakeholders interviewed identified accessibility as a concern. User groups considered the highways to be safe, although they do not always agree with the specific measures taken to promote safety (e.g., commuters and truckers criticised reduction in speed limits within some national parks which impact on the efficiency of the system).¹³ Some user groups felt that traffic volumes and the mix of traffic in peak seasons threatened driver safety. In contrast, the limited sample of external stakeholders interviewed for the evaluation had little knowledge of, or information about, environmental concerns or conservation efforts related to highways, with the exception of stakeholders for Banff National Park, where environmental issues and impacts are subject to intensive research and monitoring and made available publicly on the Banff NP website.

Expectation: Progress is being made to achieving efficient and safe traffic flow and minimizing the environmental impacts of highways.

As noted previously, the Agency does not generally measure highway outcomes directly. In the following section we review relevant data for each of the three outcomes, highlight best practices drawn from the TCH twinning project in Banff NP and identify reported barriers to routine use of outcomes measures.

Efficiency of Traffic Flow: The literature on highway performance identifies a number of efficiency measures such as average travel times, average speed, traffic density, delays, congestion and bottlenecks on particular highways or highway segments. While potential

¹³ Although some stakeholders complain about speed limits, there is also a wide spread perception that these are not respected.

metrics exist, provincial governments for example do not generally use these for reporting on the common objective of improving efficiency of transport.

Within the Agency there are many examples and reports of limits to efficient traffic flow, including vehicle weight restrictions (e.g. spring time weight restrictions on highways in Riding Mountain), speed limit reductions, and temporary, complete or limited lane reductions due to the acts of nature, as well as closures or reductions in capacity related to regular maintenance or recapitalization of a highway. With the exception of closures due to “acts of nature”, many of the other restrictions on traffic flow are directly related to asset condition. There is no systematic quantitative data on the extent, frequency or impacts of these limits on efficient traffic flow (e.g., extent highway bridge weight restrictions due to asset condition lead to delays or re-routing of heavy truck traffic flow; impacts of speed limit reductions due to asset condition on travel times).

One indicator of efficiency of highway traffic flow that has been used in the Agency is level of service (LOS). Level of service is a technical concept used by highway traffic engineers to rate a highway segment from level A (best) to F (worst) based on a variety of considerations (i.e., class of road, following distances, queuing, average traffic speed, and traffic composition among other factors). Level A represents a free flow of traffic (i.e., traffic flows at or above the posted speed limit and all motorists have complete mobility between lanes and typically occurs late at night in urban areas and frequently in rural areas). Level F occurs when flow is forced or frequently breaks down (i.e., every vehicle moves in lockstep with the vehicle in front of it, with frequent slowing required).

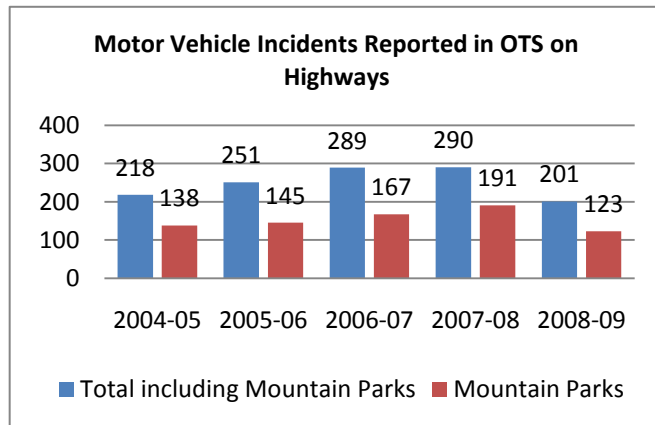
Best Practice: Level of Service Improvement on the TCH

Prior to twinning, the section of the TCH between Castle Junction and the BC border had a LOS rating of D for average traffic conditions and E for the summer. The objective of twinning was to increase the LOS to C for all hours of the year exclusive of the 200th highest hours of the year 2020 and beyond.

Twinning achieves this LOS by increasing the traffic carrying capacity of the highway (e.g., increasing the design speed of the highway), reducing congestion and the likelihood of accidents while making travel more comfortable for motorists (e.g., opportunities for passing). The Agency is waiting for more sections of twinning to be complete before producing follow up measures to compare against the baseline data.

The level of service concept was used to support the business case for the TCH twinning project in Banff NP (see Best Practice example). In the Atlantic region, the reported LOS for highways with traffic counters is B or C, with the possible exception of the TCH in Terra Nova NP where it is speculated the level of service may be D. Reported barriers to more wide spread adoption of this and other highway efficiency metrics include costs to acquire data or implement measurement systems, particularly given that the Agency is not primarily a highway manager, a lack of technical expertise within the Agency (e.g., for determining the level of service for a particular highway), and the fact that the measures are not likely to provide operational benefits to the Agency.

Safety: A key input into highway safety metrics identified in the literature review is the number of traffic accidents (or fatal accidents) typically expressed as ratios of accidents by traffic volume, density, highway condition or other factors of interest. The Federal Government, as



well as various provincial governments, routinely set targets for reductions in the number of highway accidents or fatalities.¹⁴ The Agency does have some data on the total number of “vehicle incidents” over five years, shown in the accompanying graph (Source: Occurrence Tracking System, 2004-05 to 2008-09). As noted previously, the data likely underestimates the true level of incidents since some are reported to the police of jurisdiction and not captured in the Agency’s data.

The number of recorded incidents has varied from approximately 200 to 300 for the last five years. The number of incidents involving fatalities ranged from 3 to 10 per year, and incidents involving injuries ranged from 10 to 20. The majority of recorded incidents occur in the Mountain Parks, where the volumes of traffic are the highest in the Agency’s network.

There is no discernable trend in the data. In most cases, the data cannot be readily linked to data on traffic volume, density or road condition.

The Agency did set a specific target for fatal collision reduction for the TCH twinning project in Banff NP (See best practice example).

A key barrier to obtaining highway accident data is the reported costs. Accident data is obtained from provinces which charge for producing the information. In the case of Agency highway segments this may require custom analysis and mapping of data to the assets which increases the costs.

Best Practice: Accident Reduction

Morrall (2004) found that prior to twinning the total collisions per motor vehicle kilometre in the 2000 to 2002 period were almost twice those reported for Alberta two-lane highways and that fatal collisions were five times higher (i.e., 11 fatalities, 35 injuries and 123 involving property damage).

A target of 40% reduction in fatalities was determined based on reductions in fatality/severe accidents on previously twinned sections of highway in Banff NP. The intention is to obtain accident data from province in 2012 -2013 for comparing performance to the 2004 baseline.

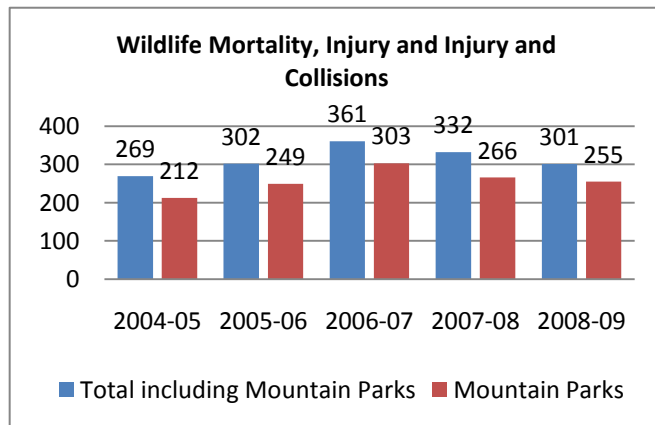
(Sources: Morrall 2004 and <http://www.pc.gc.ca/eng/pn-np/ab/banff/docs/routes/phase111b/page2.aspx>)

Environmental Impacts: Typical highway environmental performance metrics found in the literature focus on vehicle emissions and noise pollution. The Agency’s concerns with the environmental impacts of highways are somewhat different, focussing on specific impacts of highway operations on the surrounding environment (e.g., those resulting from construction

¹⁴ See for example Transport Canada's Road Safety Vision 2010 (2004) which targeted a 30% national reduction of road fatalities and severe accidents. See also the 2008/09–2010/11 Service Plan BC Ministry of Transportation, which targets a 21% reduction in the number of crashes following “construction on safety improvement capital project” by 2010-2011 from a baseline of 152 crashes in 2006-2007 <http://www.bcbudget.gov.bc.ca/2008/sp/trans/default.html#4>.

practices and the use of road salts), the contribution of highways to habitat fragmentation, the nature and extent of animal mortality due to highway operation, and the importation of invasive species along highway corridors.

Data on the aggregate amount of regular and liquid forms of road salt use is available for the April 2006 to March 2009 period, but does not show any particular trend over the period, although three years may be too short to track meaningful changes. We did not identify any systematic efforts to document the impact of salt run off on the surrounding environment.



Most of the Agency's data with respect to environmental impacts of highways deals with wildlife mortality and indirectly with the impacts of habitat fragmentation and species viability. The aggregate data on wildlife mortality, injury and collisions for roads and highways are shown in the graph (source: Occurrence Tracking System Wildlife Mortality, Injury and Collisions, 2004-05 to 2008-09). The data is similar to the motor vehicle incidents data in that the vast majority of the incidents occur in the

Mountain Parks, where the volumes of traffic are heaviest. Again, there is no definitive trend over time. The Agency's approach to mitigating the impacts of highways on wildlife mortality and species viability is illustrated in the best practice example from the TCH twinning in Banff NP.

Best Practice: Measuring Environmental Impacts and Mitigation Measures

Fencing and crossing structures are intended to work together to keep large animals off the highway and guide them to areas where they can cross safely. In turn, this is expected to increase driver safety (i.e., the number of drivers injured or killed), decrease animal mortality, and lead to greater habitat connectivity and healthier and more viable animal populations.

In Banff NP, where twinning of the TCH is taking place, use of wildlife crossing has been monitored year-round since 1996. As of June 2010, it is reported that 11 different species of large mammals have used the 30 existing crossing in the Park more than 220,000 times since the start of monitoring. Collectively, it is reported that the mitigation measures have resulted in more than an 80% reduction in all wildlife road-kills, and more than 95% reduction in road-kills for ungulate (i.e., moose, elk, deer) species. Clevenger (2007) concluded that the structures are a "significant boost for maintaining viable wildlife populations" although more research is required. Results of the research are reported to have guided the design and location of 18 new wildlife crossings being built in the current phase of highway twinning.

Research within the Park is ongoing involving multiple partners (i.e., The Miistakis Institute for the Rockies (University of Calgary), The Western Transportation Institute (Montana State University), the Wilburforce Foundation, and the Woodcock Foundation), with the Agency contributing \$1M to support the project over five years.

Sources: <http://www.pc.gc.ca/eng/pn-np/ab/banff/docs/routes/sec3.aspx>.

OVERALL FINDING: EFFECTIVENESS

Overall, there is considerable evidence that the activities and outputs to achieve the outcomes of access, efficient and safe traffic flow, and that environmental impacts are minimized, occur or are produced. These in turn can reasonably be assumed to impact on, or contribute to, the longer term results. The focus on highway condition, an output of highway management, is widely seen as a meaningful and important aspect of highway operations by both managers and stakeholders, consistent with the informal objective of ensuring seamless conditions between Agency and provincially/territorially managed sections of highways. There is evidence from our limited sample of external stakeholders that the highways are considered to be safe although sometimes external stakeholders object to the mechanisms for achieving safety (e.g., speed limits) since it is perceived as impacting on the efficiency of transport.

There is limited quantitative evidence that through highway management is effective in achieving targets for outputs or advancing outcomes, except in the case of the TCH twinning project in Banff NP where there are many best practices. Reported barriers to direct measurement of outcomes typically include the costs of obtaining the data, a lack of technical expertise within the Agency to implement specific metrics, and the need to calibrate measurement strategies to the fact the Agency is not primarily in the business of managing highways (i.e., unlike provincial Ministries of transportation).

The target of 0 days of closure due to asset condition is clear and achieved each year. However, the potential that highways would be closed in the future due to condition was not a major concern of the external stakeholders. Managers tend to believe that the Agency would not allow this to happen. In effect, the target serves as a public declaration of the Agency's minimal level of performance with respect to highway condition, and is not a performance metric important for managers' on-going decision-making with respect to highways.

A more important indicator for management purposes is the commitment to maintain highway condition over time. However, the specific target (i.e., that 60% of the asset condition is maintained) is not clear and performance against the target has never been systematically measured although data on highway condition is available. At the aggregate level, the condition of the highways has deteriorated over time so that currently, for the sub-sample of highways with repeated measures, condition is at the boundary of a fair or poor rating. Given the lack of clarity on the targeted level of performance, the significance of this information for demonstrating effective management of the through highways is unclear.

4.3 EFFICIENCY AND ECONOMY

Question 8	Indicators
To what extent is the sub-activity efficient in producing outputs and economical in producing outcomes?	<ul style="list-style-type: none"> • Extent of reports of initiatives to improve efficiency or economy • Extent of use of competitive contracting to obtain lowest possible price to produce outputs (i.e., construction contracting) • Inter-unit or inter-organizational comparison of costs of producing outputs and outcomes

Expectation: Managers are interested in and undertake initiatives to improve efficiency and economy

Anecdotally, we heard numerous examples of how field units were attempting to reduce their costs and become more efficient. For instance, one highways supervisor explained that they realized savings of half the cost of sand by renting a truck and picking up the sand themselves. Another explained they save materially on road markers by using saplings to mark the shoulders that will be hidden in winter by snow banks. Another field unit searched for a way of disposing of old asphalt affordably and ending up exchanging the old asphalt for highway patching by the purchaser. In one field unit, economies of scale are being accomplished through bulk purchasing of salt and abrasives in collaboration with the provincial department of transportation; their savings are estimated to be in the magnitude of 20%. The province and the field unit also have a service arrangement for the line striping, for which they estimate they saved between \$50,000 and \$100,000. Finally, they are also sharing one salt storage facility with the province, resulting in additional cost savings.

In other units, efficiencies and improved quality of service delivery (i.e. timeliness and consistency with the other jurisdictions) are being accomplished through coordinated service delivery. For instance, jurisdictions will “swap” areas to be ploughed so that both the Agency and the other jurisdiction are able to minimize the distance from their facilities and complete a rational “loop” of terrain. The HSC was explicitly established, following the 1994 National Roads Strategy, to provide more efficiency in service delivery of the highway and road program in the Mountain Parks.

Although managers can identify many examples of efforts to improve efficiency, there is a clear sense, both among Agency personnel and representatives of other transportation agencies, that gains in efficiency are not necessarily keeping pace with the increases in costs (i.e., there is pressure to do more with less). Table 2, in the program description, shows that Agency expenditures on highway operations and maintenance have been relatively consistent over time (i.e., averaging approximately \$20M annually over the last five years). Evidence of rising costs, often at a rate well above the average level of inflation as measured by the consumer price index, is also readily available from Statistics Canada in the form of several specialized price indices (e.g., non-residential building construction price index, petroleum and coal products price index and the asphalt price index). Stable O&M budgets with rising costs will ultimately result in decreases in the amount of activities undertaken and outputs produced, and may ultimately affect the core outcomes of efficient and safe transport and minimization of environmental impacts.

Expectation: The least amount of inputs possible is used to produce the desired outputs and outcomes.

Another indicator of efficiency, at least for major highway repairs and construction, is the routine use of competitive bidding for this work, which is inherently intended to produce the least cost option to produce the intended output. Internal audit work in

2009-2010 on EAP funded construction contracts, including spending on the TCH and other highways, showed that the bidding processes were generally well managed and conformed to government and Agency policies, increasing our assurance that this aspect of highway management produces the required outputs at the least possible cost.

Table 8 shows the quantitative analysis of expenditures by business units with through highways based on average operations and maintenance expenditures (i.e., over the last five years) per kilometre of highway managed and per vehicle of traffic. The analysis, while suggestive, is limited by the fact that both O&M expenditures and traffic counts are likely incomplete and under estimate the true values as discussed previously. Costs at national and regional offices are not included in the table.

Table 8: Average O&M Expenditures by Kilometre of Highway Managed and Vehicle Served

Field Unit	Inputs			Indicators	
	Two-Lane Kilometres Managed	Five Year Average O&M (\$000)	Volume (000)	O&M Expenditures (\$) per Kilometre Managed	O&M Expenditures (\$) per vehicle
East Newfoundland	53.6	492	600*	9,179	0.82
West Newfoundland & Labrador	103.5	1,195	200*	11,546	5.98
Cape Breton	80.6	1,642	NA	20,372	
South New Brunswick	20.6	249	200	12,087	1.25
North New Brunswick	23.7	251	200	10,591	1.26
Gaspésie	10.7	133	300*	12,430	0.44
East	292.7	3,961	1,500		
Riding Mountain	83.8	618	550*	7,375	1.12
Northern Prairies	90.1	NA	NA		
HSC	454.25	14,729	12,650	32,425	1.16
Coastal B.C.	21.4	84	NA	3,925	
Wood Buffalo	114.2	800	45	7,005	17.78
West	763.75	16,232	13,245	21,253	1.23
Total	1,056.45	20,193	14,745	19,114	1.37

Sources: Data on kilometres of highways managed is reproduced from Table 1. The average O&M expenditures over five years are derived from data in Appendix B. The average expenditures for the HSC include the totals recorded for the HSC and for the individual field units serviced by the HSC. Expenditures for Wood Buffalo NP reflect the \$800K O&M cost in the 2009-2010 Agreement with the Territorial Government (i.e., prior to that the service was free of charge). Volume data is reproduced from Table 6.

*Volume is for a 6 month period or less.

The overall average O&M expenditures per two-lane kilometre of highway managed is just over \$19K which is consistent with the inflation adjusted results from the analysis of highway costs in the 1994 National Roads Strategy (i.e., expenditures per two-lane kilometre at the time were \$9.6K which when adjusted for inflation are similar to or more than current expenditures depending on the level of inflation assumed).

There is considerable variation in business unit expenditures, either by kilometre managed or by vehicle serviced. Generally, expenditures per kilometre fall in the range of \$7K to 12.5K except for three units (i.e., Cape Breton and the HSC with average expenditures of approximately \$20K

and \$32K respectively, lower in Coastal BC at just under \$4K). Average expenditures per vehicle of traffic generally fall in the range of \$0.44 to \$1.26 with the exception of the Western Newfoundland and Labrador at about \$6 per vehicle and Wood Buffalo where the new contract with the territory is equivalent to just under \$18 per vehicle.

The two indicators do not produce a consistent rank ordering of business units (i.e., a unit may be high on expenditures per kilometre of highway managed but lower on expenditures per vehicle serviced as is the case with the HSC, or conversely low on expenditures per kilometre but high on cost per vehicle serviced as is the case with Wood Buffalo NP). This suggests that efficiency or economy in the context of highway management is multi-dimensional and decisions need to be based on balancing different perspectives and objectives for highway management.

The fact there is variation in business units' expenditures per kilometre of highway managed or vehicle serviced is consistent with the interview and other data which suggested that the amount of resources required to produce a given output or outcome are likely to vary given differences in labour and/or material costs, climate and geography. Therefore, there is unlikely to be a single standard target for efficiency or economy that is applicable to all highways managed by the Agency at any one time or over time for the same highway. A range of generally acceptable ratios is useful as a benchmark target but values outside the range may be reasonable in particular contexts. In this sense, ratios outside a normal range of target values serve more as a trigger for farther investigation rather than a definitive marker of good or poor efficiency.

While calculating average expenditures in relation to outputs or reach of highways is useful, it does not address whether the resulting range of values is reasonable or sufficient for achieving highway outcomes. As discussed below, actual O&M expenditures are not often consistent with expenditure standards and there is a general sense that available resources are not adequate to manage the operations. Efficiency ratios need to be balanced against consideration of the investment requirements.

Some sense of whether absolute investment levels are reasonable could in theory be obtained from comparisons to other highway operators' costs for comparable highways. As noted, we were not able to access this type of data. Several key informants within the Agency noted that before making these comparisons, adjustments would need to be made to take into account the fact that Parks Canada costs are likely to be higher because of the specific environmental concerns the Agency brings to its operations. For example, aggregate and abrasives are critical for both the maintenance and construction of highways and the cost of these materials varies immensely based on the hauling distance from the source. As such, a decision not to have a source of gravel in a park for environmental reasons increases the costs of operations. Similarly, constructing animal under/overpasses for the TCH twinning in Banff NP was estimated to increase the project costs by 17%.

OVERALL FINDING: EFFICIENCY AND ECONOMY

The evidence that highways are managed efficiently and economically rests largely on the fact that managers demonstrate an interest in and have implemented many initiatives with the intent of increasing the efficiency and/or economy of highways operations, and the routine use of competitive contracting for major repair and construction projects, which are inherently intended to result in least cost solutions.

There is a general sense that efficiency gains and use of low costs options are not serving to compensate for what are relatively static budgets, a concern shared by representatives of provincial/territorial transportation departments interviewed during the evaluation with respect to their own operations. In the long-term this creates potential risks for the Agency's ability to provide efficient and safe transport and to minimize the environmental effects of highways on national parks and historic sites.

Available quantitative data on expenditures by kilometres of highway managed or vehicles serviced is useful for comparing the efficiency of business units within the Agency. This data is incomplete, not coded at the level of individual highways and underestimates the true operating costs and number of vehicles served. Comparisons based on the available data show the expected variation in the ratios across business units and specific cases where ratios are outside the common range of values. Different efficiency ratios do not necessarily produce consistent results suggesting that efficiency of highway management is multidimensional and that there is a need to balance different efficiency perspectives in decision-making. At best, efficiency ratios are likely most appropriately used for triggering questions and further investigation rather than as stand alone metrics that unambiguously establish whether particular business units, or the Agency as a whole, are more or less efficient or economical than each other or other highway operators.

4.4 PROGRAM DESIGN AND DELIEVERY

Question 8	Indicators
Are the governance structures, processes, and resources for highway management appropriate and adequate to achieve the desired outputs and outcomes?	<ul style="list-style-type: none"> • Management reports of appropriateness and adequacy of structures, processes and budgets • Expenditures on operations/ maintenance and recapitalization as a percentage of the replacement value of the assets • Displacement of funds from other activities to the highway program • Highway expenditures as a portion of the overall business unit's budget

Expectation: Governance structures and roles are understood and seen to be appropriate.

As with many programs and activities in the Agency, overall governance for the through highways sub-activity is shared between different levels of management.

National Office retains functional authority for policies, directives and, to a certain extent, information systems. Responsibilities for implementation and monitoring is delegated to the Directors General, Eastern and Western/Northern Canada, and through them to Field Unit Superintendents. The roles of the various levels of management for through highway management are generally well understood and accepted throughout the Agency.

Although not widely identified as a problem with program design, we did note that the particular highways identified as part of the through highways sub-activity, as listed in Table 1, are no longer consistent with the accounting definition of through highways and that not all highway costs under the current definition are recorded in the financial system. Other costs such as the extensive investment in monitoring the environmental impacts of highways in Banff NP are also not currently captured as part of the sub-activity costs. Therefore, the total costs of the through highways activity are underestimated.

Expectation: Resources are sufficient to support program outcomes.

Managers' major concern is with the adequacy of resources to achieve outcomes. Investment standards for assets in general call for expending 2% of the asset

replacement values (RV) in annual maintenance and 2% in capital investment. An investment of 1% of asset replacement values in operations has also been suggested by the Real Property Group in Parks Canada, based on comparative research with other organizations (Parks Canada Agency Asset Reinvestment Benchmarks, Corporate Research Group March 2008). As noted in the *Evaluation of Parks Canada's Asset Management Program*, the Agency has not set formal investment standards, although it has used the standard 3% of asset replacement values for investment in operations and maintenance and 2% of RV for capital investment in some circumstances. We used this standard for purposes of assessing the adequacy of resources.

Table 9 shows the O&M and capital investments in through highways for the Agency as a whole and by regions.

Table 9: Ratios of O&M and Capital Spending Over Asset Replacement Value

	Agency		East		West/North	
	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09
Replacement Value (\$000)	1,000,414	1,000,414	279,019	279,019	721,395	721,395
Spending (\$000)						
O&M	20,831	20,179	4,420	4,013	15,963	15,584
Capital	33,176	50,898	2,557	8,934	30,619	41,964
Ratios						
O&M/RV (%)	2.1%	2.0%	1.6%	1.4%	2.2%	2.2%
Cap/RV (%)	3.3%	5.1%	0.9%	3.2%	4.2%	5.8%

Data sources: Expenditure Reports (for spending); AMS database (for asset RV).

Note: RV value was held constant as per calculations in the framework in 2009.

Annual expenditures on O&M for the two years shown in the table do not meet the standard of investing 3% of the assets RV in operations and maintenance. Capital investment has met the standard of investing 2% of the assets RV. However, this is distorted by the fact 50% of the capital investment in highways for both years was directed at the twinning of the TCH in Banff. Removing this highway and the associated investment from the analysis results in capital investment ratios of 1.2% for the Agency overall.

With the influx of special purpose funding with the Economic Action Plan, the fiscal years 2008-2009, through 2010-11 will allow the Agency to meet the standard for capital investments. However, when these sources of funds are exhausted, and based on the historical levels of capital investments, the Agency will likely not have a sufficient funding base to meet the capital investment standard. This result is not surprising and applies to all asset management in general, as was extensively documented in the 2009 *Evaluation of the Parks Canada Asset Management Program*.

Inadequate or deferred investment, at any stage of asset management process (i.e., normal operations, preventative or corrective maintenance), will result in higher downstream costs and reduced life expectancy of the asset. Vanier (2000), for example, references the “law of fives” in which deferred maintenance results in repairs equalling five times the original maintenance costs, and deferred repairs can lead to renewal costs up to five times the cost of the repair.

Expectation: Highway budgets are sufficient to meet obligations without impacting on other areas of mandate delivery.

The percentage of total field unit expenditures devoted to the highways sub-activity varies from less than 1% to 12% of total expenditures over the April 2006 to March 2010 period. For some managers, this represents

resources they would rather devote to serving the Agency’s core mandate. Many reported facing difficult decisions in the allocation of funds, and given safety concerns, they prioritize winter maintenance activities, such as snow removal and spreading salt and abrasives, over maintenance on internal roads (i.e., either reduced access or through closures of internal roads).

Future costs for improving the condition of highways rated in poor or very poor condition are typically very high (i.e., for the TCH between \$325,000 and \$825,000 per kilometre depending on current condition and between \$225,000 to \$600,000 per kilometre for provincial highways depending again on the condition of the highway based on estimates in PWGSC PMU reports

from 2007 to 2009). While in some cases in Western Canada the Agency has proposed lesser investment requirements to make the highway “suitable for its intended use”, the total liability estimated at \$225M cannot be addressed with the Agency’s annual targeted capital budget of \$120M per year for all assets. The Agency is currently in the process of preparing a long term investment strategy for all assets and has in place risk based approaches for allocating capital investment, either at a regional or national level, as reviewed in the program description (see page 7).

Question 9	Indicators
To what extent are activities and outputs guided by and in conformance with relevant standards?	<ul style="list-style-type: none"> Existence of policies or directives related to standards or standard setting Extent standards balance considerations of risk and costs

Expectation: Standard for performing activities (e.g., construction standards) or producing outputs (e.g., snow removal) are articulated, publicized, and compliance is monitored

Provincial governments typically establish and publish operating/maintenance standards for highways (e.g., time in hours or days for snow clearance, tolerable snow accumulation on the ground). Publishing standards communicates to users and other stakeholders what they should expect for a particular activity. Provincial service standards are based on considerations such as traffic volume, weather conditions, and road classification, although the factors considered and the resulting standards differ between provinces. Provincial governments also establish construction standards or guidelines. Some elements of the highway system (e.g., bridges) have national codes that influence provincial codes.

The Agency does not have a recent policy with respect to maintenance or other highway standards (i.e., barring for example the 2008 Directive for the Design, Construction and Inspection of Vehicle and Pedestrian Bridges). In our interviews, we heard a few references to precise national standards for salt application, snow clearing, and other activities and outputs set out in 1986 (i.e., Environment Canada – Parks Roads Winter Maintenance Standards).¹⁵

The National Roads Strategy (1994) recommended that Parks Canada adopt provincial standards, practices, and levels of service for roads, and measure compliance with these standards in part at least to reduce risks of legal liabilities resulting from the operation of highways. While the study favoured adoption of provincial standards, it does include caveats that consideration needs to be given to the ability of the Agency to fund the activities necessary to meet the standards.

Legal risks and potential liabilities arise when third parties make claims against the Crown (i.e., typically when Parks Canada is named as a third party to a personal injury action it is because of its alleged failure to maintain the condition of its roads). Lawsuits are more common in the Mountain Parks compared to other highways in the system, consistent with the number of reported vehicle incidents. According to senior management at HSC, there are on average about fifteen new cases per year of third parties initiating actions, including the Agency, which take

¹⁵ The standards are still available on the Agency’s intranet site, listing relevant policies, directives, tools and documents for various aspects of asset management.
(http://intranet/content/realprop-immob/asset-biens-eng/TOC-maintenance_standards-normes_entretien.asp)

from one to two years to resolve. A few of these cases are reported to have the potential to lead to material settlements (i.e. in the vicinity of \$500K). Data on hand were insufficient to permit a total estimate of Agency exposure.¹⁶

Setting unrealistic standards, given limited funding, may serve to create unrealistic user expectations and could pose additional legal risks. Many, but not all, asset managers and staff indicated in interviews and questionnaires that they have “informally” adopted local provincial standards, in part to ensure consistent road conditions between the Agency’s through highways and the connected provincial road works.

Key informants within the Agency were split on whether informally adopting provincial or other standards was sufficient to manage the legal risks. Those in National Office tended to prefer adopting formal standards, while some asset managers in field reported that informal adoption of the provincial standard was sufficient.

Only two management units, the HSC and Cape Breton Highlands NP, have established clear operational standards, and only for snow removal. The HSC defined its winter maintenance standards based on those established by the provinces of Alberta and British Columbia. Only the standards for Cape Breton Highlands NP are publicly available.

Unlike the situation with operational standards, there is consensus that the Agency adheres to relevant provincial standards for highway construction. As noted previously, there has also been a concerted effort in the last few years to inventory high risk assets such as bridges and dams and to develop new guidance and inspection regimes.

Question 10	Indicators
Are there reasonable and practical alternative delivery models for through highways management?	<ul style="list-style-type: none"> • Existence of delivery options • The extent to which management has explored alternative options and has adjusted delivery to particular circumstances

Expectation: Management has considered different program delivery options and tailored these so they are relevant to identified goals and objectives.

Delivery models for highways management vary from direct delivery by individual field units, through regional delivery, to contracted delivery either with provincial governments or private sector contractors. The dominate model, as shown in Table 1, is PCA delivery (21 of 28 highways is direct delivery by PCA – 13 by nine individual field units and 8 collectively by the HSC in Western Canada). The maintenance of the others is provided through contracting with a territorial or provincial government (i.e., in Forillon and Wood Buffalo National Parks and Gros Morne NP for winter only) or with a private contractor (i.e., Kouchibouguac NP and Pacific Rim National Park Reserve). None of the contractors assume costs or responsibilities for highway capital requirements.

¹⁶ Conversely, the Crown may make claims against a third party for damage to Agency assets (e.g. damage to bridges, guardrails, effects of vandalism). It is reported that in the recent years, damages ranging from a few hundred dollars to \$60K have been awarded; which often but not always paid to the Agency.

Our case studies were specifically selected to provide more detail on alternatives to direct field unit operation and maintenance of highways, either through contracting for service or through more centralized service delivery across field units (i.e., HSC). In the cases of Forillon NP and the HSC, there is wide spread support for the delivery models and general perceptions that these arrangements make sense in the local context. The arrangement in Wood Buffalo NP is more recent (i.e., formally the service was provided at no cost to the Agency by the Territorial Government) and there is still uncertainty until a permanent agreement is reached.

It was noted that given fixed costs for direct operations of highway (e.g., acquiring and operating heavy machinery associated facilities and staff), that it is more efficient and economical to operate longer rather than shorter lengths of highways. However, there are limits to the highway length that can be managed with a single set of inputs, at which point additional equipment, facilities, or staff will be required. This kind of reasoning in part drove the establishment of the HSC, where efficiencies in managing a group of highways in a limited geographic area were evident. Additional central or regional delivery of highway operations across a wider geography would not necessarily provide comparable efficiencies and there is little evidence of support for further regional or central delivery of the highway management.

A few key informants within the Agency also suggested that the provincial authorities were better positioned to operate through highways, indicating that current Parks Canada operations and infrastructure duplicates services already provided by the provinces, costs of procuring and maintaining equipment are excessive compared with the provinces, and provinces are better able to ensure the seamlessness of highway service levels and condition with their own system.

The issue of divestiture of highway operations, maintenance and capitalization to provinces/territories has been entertained several times, with the most recent efforts focused on highways included in the National Highways System. Divestiture in this context involves establishing a long-term lease of a highway to a province or territory and transfers of Parks Canada assets and financial and/or human resources, while continuing to have some control/influence over operating and maintenance standards, particularly in supporting the Agency's visitor and environmental objectives. It does not imply the transfer of ownership.

This is similar in many respects to divestitures associated with townsites and operations within national parks. The Agency directly manages, operates and provides municipal services for five townsites but has divested these responsibilities along with assets and personnel in Banff (1990) and Jasper (2002) to self-governed municipalities. In both cases, the Agency retains specific authorities (i.e., for community plans and by-laws in Banff, and for community plans, land-use planning, and development in Jasper).

In the case of highways, none of the Agency's previous attempts to divest responsibility for highway operations, maintenance or capital investments have been successful. Interviewees suggested a number of possible factors that prevented agreements, including a lack of "political will" among the parties, inability to agree upon appropriate financial incentives for such a transfer, and a desire by the Agency to retain ownership and some control or oversight of highways sections cutting through parks.

Divestiture is not the same as simply switching to contracting for services as is the current practice in several national parks. Contracting takes place in parks where for historical reasons the Agency has not built up its own infrastructure and resources to deliver the program. We only identified one instance where management of a field unit had explored the economies of moving to contracting for services where delivery capability already existed. This did not result in a change to the delivery model. In the absence of provisions for divestiture of existing capacity, the upfront costs of switching to a contracting model would be, presumably, very high.

Analysis for the Agency's 1994 National Roads Strategy did examine the British Columbia Government model of contracting almost all road maintenance in the province (i.e., some speciality maintenance and avalanche control is not contracted) to the private sector and reported that it led to no appreciable cost savings over public delivery. It was beyond the scope of the evaluation to replicate this analysis in the current environment.

OVERALL FINDING: PROGRAM DESIGN AND DELIVERY

Highway management in the Agency is generally seen to have adequate governance structures and processes. Several different delivery models for operating and maintaining the highways are in place, including direct delivery by a local field unit (i.e., the dominant model), regional delivery in the case of the HSC, and contracting for services either with provincial/territorial governments or the private sector. Where alternatives to the direct local delivery are in place, these are seen to be appropriate and to be working for the benefit of the Agency. The Agency has explored, but has not been successful, in establishing long term leases and divesting assets and resources, for additional highways, to the provinces/territories.

Managers' primary concern with through highways management relates to the adequacy of resources for managing highways. Available resources are generally considered insufficient, do not meet typical investment standards (i.e., expressed as a ratio of O&M or capital investments over the RV of the assets) and results in pressure on managers in some cases to divert funds from the core areas of the mandate to ensure that highways are safe. The issue of adequate investment levels is not specific to through highways but a challenge for asset management in general, as was extensively documented in *Evaluation of the Parks Canada Asset Management Program (2009)*.

A second concern relates to highway operating and maintenance standards adopted in the Agency (i.e., construction standards are generally not considered an issue). There is no formal policy or direction with respect to standards that should be used by managers of specific highways, although informally it is understood that relevant provincial standards should be adopted where possible. Standards are important both from the perspective of managing legal risks and potential for liabilities arising from lawsuits and for informing users and stakeholders of intended levels of service (i.e., snow removal times) or intended quality of outputs (e.g., construction standards).

5. CONCLUSIONS AND RECOMMENDATIONS

Through highways represent about 10% of the estimated \$10.5B in replacement value of Agency's asset portfolio and on average approximately 11% of the Agency's direct program expenditures over the last five years. If these assets are not well managed, it could have serious consequences for smaller communities' access to the wider highway system, the efficient and safe flow of traffic within this system, and important environmental consequences for national parks and national historic sites where the highways are located. Given the materiality of the investment in the assets and the nature of the risks associated with through highways operation, the sub-activity was identified as a high priority for evaluation in both the 2009-2010 and 2010-2011 Parks Canada Evaluation Plans.

The evaluation focused on the continuing relevance of through highway management, the effectiveness, efficiency and economy of its operations, and questions related to the design and delivery of the sub-activity. Our broad conclusions are:

- The highway segments managed by the Agency have important functions within the network of national and provincial highways and are at the aggregate level used by a substantial number of drivers. There is a sound constitutional and/or legislative basis for the federal government and Parks Canada's ownership and oversight of highways within parks and historic sites. The Agency's approach to managing these assets contributes to the Government of Canada's priorities, particularly economic and safety-oriented goals.
- Parks Canada ownership of the highway segments is mandated by legislation, but direct operation of the highways is not required either in legislation or for delivery of the Agency's mandate or strategic objective. Alternative approaches to direct delivery are in place for some highways, and additional possibilities for divestiture of highways operations to provinces/territories that operate the vast majority of highways in Canada have been explored, so far unsuccessfully.
- The Agency consistently focuses on a common set of core outcomes in its management of highways including accessibility, efficiency and safety of traffic flow and minimizing environmental impacts of highways, in common with many other managers of highways. There is considerable evidence from direct observation, surveys and interviews with managers and document and file review that the relevant activities occur and outputs are produced that support achieving the intended outcomes. Within our limited sample of external stakeholders, little concern was evidenced with respect to the operation and maintenance of highways and their safety relative to adjacent provincial or territorial roads.
- Quantifiable evidence that through highways management is effective in achieving or impacting on the generally accepted outcomes is generally limited to the TCH in Banff NP. Costs of implementing measurement of reach (i.e., traffic counts) and outcomes, lack of technical expertise needed for some measures, lack of demand in the context of day-to-day operational management, and the fact that the Parks Canada is not primarily a transportation agency are all cited as reasons for not developing these kinds of measures.
- The Agency has focused its corporate performance measurement activities for through highways on one output, highway condition, a meaningful and important indicator for both management and stakeholder. However, its specific targets related to condition, while useful in one case as a public declaration of the minimal level of asset condition the Agency will accept (i.e., 0 days closure due to asset condition), are either not relevant to managers day to

day operations of highways or are stated in a way where the intended performance is not clear or measurable (i.e., maintain the condition of 60% of the highways).

- The evidence that highways are managed efficiently and economically rests largely on the fact that managers demonstrate an interest in and have implemented many initiatives with the intent of increasing the efficiency and/or economy of highways operations, and the routine use of competitive contracting for major repair and construction projects, which are inherently intended to result in least cost solutions. There is a general sense that efficiency gains and use of low costs options are not serving to compensate for what are relatively static budgets, a concern shared by representatives of provincial/territorial transportation departments interviewed during the evaluation with respect to their own operations.
- Quantitative data for judging the efficiency and economy of highway operations is limited in several respects; however, it useful in demonstrating that efficiency in highway management is a multidimensional concept and that decision-making needs to balance multiple perspectives. At best, efficiency ratios are likely most appropriately used for triggering questions and further investigation rather than as stand alone metrics that unambiguously establish whether particular units are more or less efficient or economical than others.
- With respect to program design and delivery, we noted a wide spread understanding of and support for the overall governance structures and processes. Key concerns with respect to the design and delivery of through highways management are the adequacy of resources for achieving the objectives and the need for, and benefits of, setting clear operating and service standards both from the perspective of managing legal risks and potential for liabilities arising from lawsuits and for informing users and stakeholders of intended levels of service (i.e., snow removal times) or intended quality of outputs (e.g., construction standards).

In summary, while the evidence from the various lines of inquiry provides strong support for the continued relevance of through highway management, evidence of the performance (i.e., effectiveness, efficiency and economy) of through highways management in relation to the generally understood outcomes is weaker and largely based on qualitative interview data and the fact that many relevant activities are carried out and outputs are produced. It was beyond the scope of the evaluation to compensate for this lack of key primary data on performance.

Many of the issues identified with through highways management also apply to assets in general as documented in the *Evaluation of Parks Canada's Asset Management Program* (2009). These include inconsistencies in definitions of assets (i.e., which highways are considered part of the through highways sub-activity), lack of consistent expenditure data per facility (i.e., in this case segment of highway managed), insufficient resources to manage the asset base, and a lack of clear and consistent performance expectations and targets and measurement systems to support reporting on assets in general. To the extent that these issues are already the subject of evaluation recommendations and management responses from this evaluation, we do not repeat them here.

The following recommendations were developed for action by the responsible managers and are specific to the through highway management sub-activity.

Recommendation 1:

The Chief Administrative Officer should coordinate, in conjunction with DGs Eastern and Western/Northern Canada, a review of the corporate performance target with respect to maintaining highway condition and ensure it is clear, measurable and monitored.

Response

Agree: The CAO will work with the DGs Eastern and Western/Northern Canada, to develop options for the target. Options proposed for Executive Management Committee decision will address the concerns expressed regarding clarity and measurability. The target options will have a clear and approved definition (consistent throughout the agency), will be measurable and will have an approved measurement methodology (calculation and baseline). The actions will be complete by June 30, 2011.

Recommendation 2:

The DGs Eastern and Western/Northern Canada should, in conjunction with the CFO, ensure that highways belonging to the sub-activity are consistently defined and that expenditures for each through highway are accurately captured in the financial system, consistent with policy requirements that sufficient performance information is available to effectively support the evaluation of programs.

Response

Agree: The DGs Eastern and Western/Northern Canada will seek further direction from the CAO on the definition of the sub-activity to ensure the consistency of coding of expenditures. Once clarification is obtained, the DGs Eastern and Western/Northern Canada will work with the CFO to establish costing guidelines and a coding framework to capture expenditure information for each through highway by June 30, 2011.

Recommendation 3:

The Chief Administrative Officer, in conjunction with the DGs Eastern and Western/Northern Canada, should provide policy, directives, or guidance with respect to operation, maintenance and construction standards for highways.

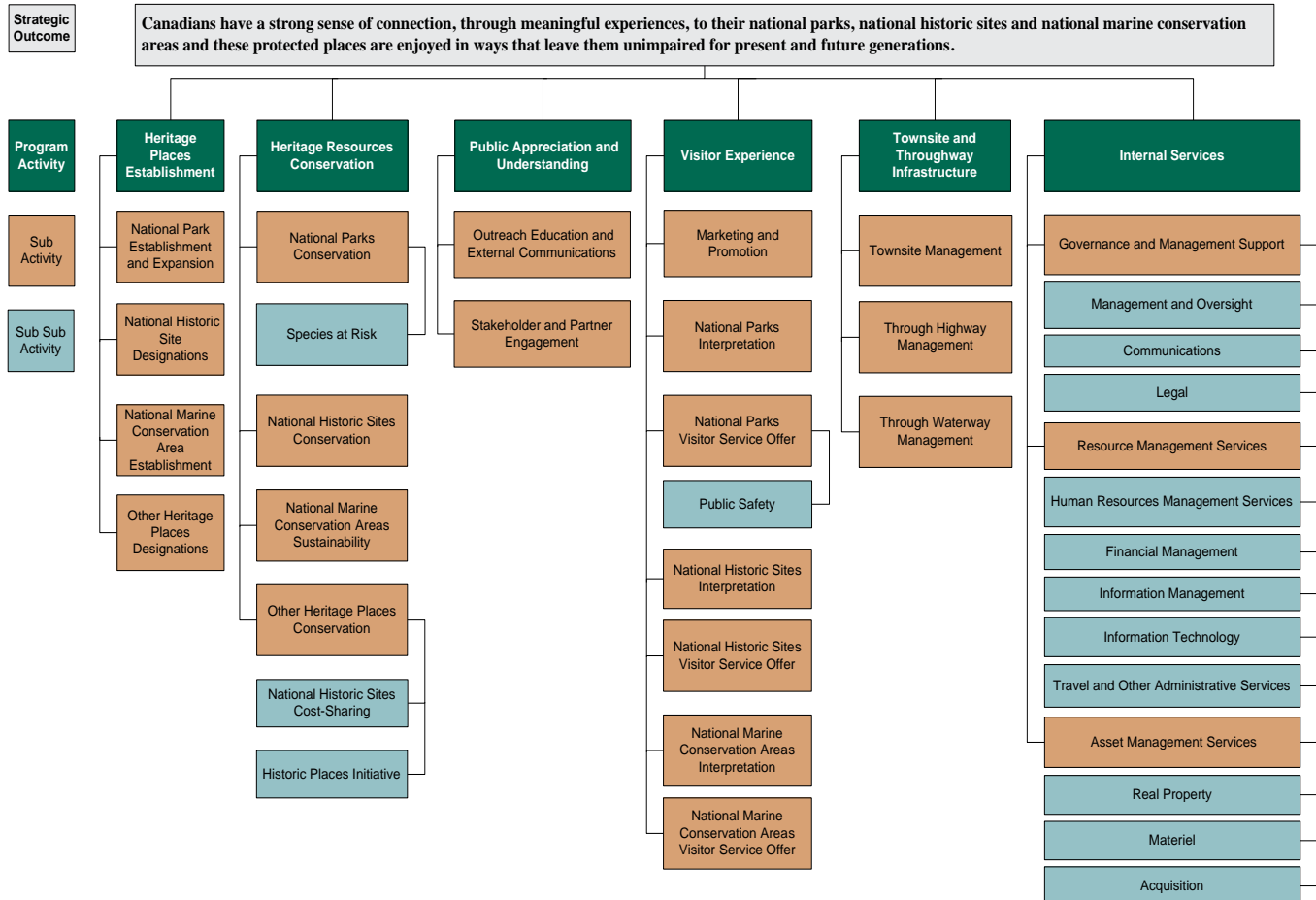
A nationally consistent approach to standards does not require that the same standard be applied to all highways across the country. Practices already vary by province and in some cases are local where there are challenges in meeting provincial standards. Whatever standards are adopted they should be legally defensible and publicly accessible so that service expectations are clear to users and stakeholders.

Response

Agree: The CAO will work with the DGs Eastern and Western/Northern Canada, to review and update existing policy, directives or guidance pertaining to the operations, maintenance and construction standards for highways for completion by November 30, 2011.

APPENDIX A: STRATEGIC OUTCOME AND PROGRAM ACTIVITY ARCHITECTURE

Parks Canada Agency Strategic Outcome and Program Activity Architecture 2009/2010



APPENDIX B: EXPENDITURES ON THROUGH HIGHWAYS BY BUSINESS UNIT

All Expenditures (O&M and Capital) by Business Unit (before EBP and corporate services)

FU / BU	2005-06	2006-07	2007-08	2008-09	2009-10
NFLD. East	655	456	575	800	534
NFLD. West & Labrador	949	1,352	1,344	2,096	2,558
Cape Breton Islands	1,779	5,422	4,320	6,367	12,219
South New Brunswick	357	397	397	3,238	11,077
North New Brunswick	223	368	207	310	276
Gaspésie	128	131	134	136	138
TOTAL EAST FU	4,091	8,126	6,977	12,947	26,802
Riding Mountain	506	491	883	320	1,155
Northern Prairies	0	12	31	3,739	19
Banff	25	337	9	7	1
Jasper	75	17	4	20	19
Kootenay / Yoho	2	1	9	140	2
Mt Revelstoke / Glacier	344	313	1,649	399	345
Waterton / Bar U	0	28	131	18	150
Coastal B.C.	94	87	98	85	63
South NWT	0	0	0	0	0
Highways S. C. (HSC)	26,770	56,209	43,768	52,319	84,650
TOTAL WEST FU/BU	27,816	57,495	46,582	57,547	86,404
Treasury	110	0	371	518	9,555
DG PCA West	6	2	3	0	30
Western S. C.	138	172	62	64	69
Ex Dir S. C.	0	0	12	0	0
Other	0	0	0	0	72
TOTAL OTHER	254	174	448	582	9,726
GRAND TOTAL	32,161	65,795	54,007	71,076	122,932
AGENCY TOTAL	484,755	557,427	585,497	635,625	721,169
% of Agency	6.6	11.8	9.2	11.1	17.0

Source: PAA Expenditure Summaries, Finance Branch

All expenditure tables are in \$000 and include salary and wages but not EBP. Some recorded expenditures for units without through highways (\$1-2M a year for a total of approximately \$8M over five years) are excluded. Some units with through highways indicated that they report highway expenditures against PA4. Other units indicated that expenditures on internal roads are included in the figures reported in this table. No adjustments have been made to these tables for these discoveries.

O&M Expenditures by Business Unit (before EBP and corporate services)					
FU / BU	2005-06	2006-07	2007-08	2008-09	2009-10
NFLD. East	397	456	575	584	446
NFLD. West & Labrador	832	1,140	1,257	1,481	1,263
Cape Breton Islands	1,493	1,778	1,968	1,334	1,635
South New Brunswick	199	299	279	250	219
North New Brunswick	223	368	207	228	229
Gaspésie	128	131	134	136	138
TOTAL EAST	3,273	4,172	4,420	4,013	3,930
Riding Mountain	456	417	530	577	1,110
Northern Prairies	0	0	0	0	0
Banff	25	11	9	7	1
Jasper	57	17	4	20	19
Kootenay / Yoho	2	1	9	4	2
Mt Revelstoke / Glacier	177	245	210	254	297
Waterton / Bar U	0	28	131	18	150
Coastal B.C.	94	87	98	85	58
South NWT	0	0	0	0	0
Highways S. C. (HSC)	12,762	15,516	14,972	14,619	14,080
TOTAL WEST	13,573	16,322	15,963	15,584	15,717
TOTAL OTHER	254	174	448	582	9,662
TOTAL HIGHWAYS	17,100	20,668	20,831	20,179	29,309
% of Agency total	5.2	4.5	4.3	4.0	5.5

Capital Expenditures by Business Unit (before EBP and corporate services)					
FU / BU	2005-06	2006-07	2007-08	2008-09	2009-10
NFLD. East	257	0	0	216	88
NFLD. West & Labrador	117	212	87	614	1,295
Cape Breton Islands	286	3,644	2,352	5,033	10,584
South New Brunswick	157	98	118	2,989	10,858
North New Brunswick	0	0	0	82	47
TOTAL EAST	818	3,954	2,557	8,934	22,872
Riding Mountain	50	74	353	243	45
Northern Prairies	0	12	31	3,739	19
Banff	0	326	0	0	0
Jasper	18	0	0	0	0
Kootenay / Yoho	0	0	0	136	0
Mt Revelstoke / Glacier	167	68	1,439	145	48
Waterton / Bar U	0	0	0	0	0
Coastal B.C.	0	0	0	0	5
Highways S. C. (HSC)	14,008	40,693	28,796	37,701	70,570
TOTAL WEST	14,243	41,173	30,619	41,964	70,687
TOTAL HIGHWAYS	15,061	45,127	33,176	50,898	93,623
% of Agency Total	26.5	45.4	33.9	46.1	48.5

APPENDIX C: EVALUATION QUESTIONS, EXPECTATIONS, INDICATORS AND DATA SOURCES

Evaluation Questions	What Should be Observed	Indicators	Data source
Relevance			
1. Is there a continuing need for the highways?	1. Highways are used and/or have important functional roles in the transportation network.	<ul style="list-style-type: none"> • Level of use (vehicle traffic) • Extent highways provide important social and/or economic benefits 	<ul style="list-style-type: none"> • Highway managers data on vehicle traffic • Internal and external documents, and interviews with Parks Canada officials on the roles of highway
2. Is there a constitutional and legal basis for the federal government and Agency in the operations of highways?	2. There is a constitutional and legal basis for a federal government role in the operation of highways. 3. Legislation sets out legal authority and responsibilities for Parks Canada's ownership and operation of highways.	<ul style="list-style-type: none"> • Extent constitutional separation of powers and laws authorize the federal government to operate highways • Extent legislation specifies the legal authority and responsibility of Parks Canada for the highways it manages 	<ul style="list-style-type: none"> • Literature and document review
3. To what extent is the ownership and operation of highways aligned with Parks Canada's mandate and objectives and with overall government priorities?	4. Ownership and operation of the highway is linked to the Agency's mandate and strategic outcome. 5. Highways are operated in a manner that contributes to the whole of government priorities.	<ul style="list-style-type: none"> • Extent the goals and objectives of the highway program are consistent with the whole of government framework and Parks Canada mandate and priorities 	<ul style="list-style-type: none"> • Literature and document review • Site visits and interviews with Field Unit (FU) management
Effectiveness			
4. To what extent are the expected activities occurring and the anticipated outputs being produced	6. Expected operating and maintenance activities occur and outputs are produced and logically related to the intended outcomes.	<ul style="list-style-type: none"> • Reported extent of activities and outputs • Perceptions of the adequacy and/or quality of the operating and maintenance activities • Logic links between activities, outputs and outcomes • Statistics showing level of effort invested in specific activities or the nature or quantity, or quality of outputs produced 	<ul style="list-style-type: none"> • Survey of and interviews with managers • Interviews with external stakeholders • Site Visits • Managers records, information systems • Program documents and analysis
5. Are performance targets for activities or outputs important to managers and stakeholders,	7. Performance targets are clear, meaningful and intended levels of performance are achieved.	<ul style="list-style-type: none"> • Logical relations between performance measures and outcomes • Extent measures and targets are seen to 	<ul style="list-style-type: none"> • Manager survey, interviews and management unit records

logically related outcomes and achieved?		<ul style="list-style-type: none"> • be meaningful and useful • Number of day of highway closure due to asset condition • Highway pavement condition ratings over time 	and documents
6. To what extent are expected outcomes (i.e., efficient and safe traffic flow and minimizing environmental impacts) being achieved?	8. Managers share common understanding of the intended outcomes in highway management. 9. Stakeholders report that the Agency is providing accessible, efficient, safe operations and that environmental impact is minimized. 10. Progress is being made to achieving efficient and safe traffic flow and minimizing the environmental impacts of highways.	<ul style="list-style-type: none"> • Extent of common understanding of goals and objectives of highway sub-activity • Stakeholders' perceptions of the extent to which highways are accessible, efficient, safe and environmental impacts are minimized • Measures of efficient transport (e.g., vehicle volume by kilometre), safety (e.g., vehicle incidents by length) or environmental impacts (e.g., vehicle wildlife conflicts) 	<ul style="list-style-type: none"> • Literature review on performance metrics for highways • Site visits, survey of and interviews with field unit staff and management and stakeholders • Management unit records and reports (e.g., management plans, business plans, research reports) • Data from Occurrence Tracking System (e.g., vehicle incidents, vehicle wildlife conflicts)
Efficiency and Economy			
7. To what extent is the program efficient in producing outputs and economical in producing outcomes?	11. Managers are interested in and undertake initiatives to improve efficiency and economy. 12. The least amount of inputs possible are used to produce the desired outputs and outcomes.	<ul style="list-style-type: none"> • Extent of reports of initiatives to improve efficiency or economy • Extent of use of competitive contracting to obtain lowest possible price to produce outputs (i.e., construction contracting) • Inter-unit or inter-organizational costs of producing outputs and outcomes 	<ul style="list-style-type: none"> • Manager survey and interviews and unit reports and analysis on initiatives • Expenditure data from financial system supplemented by management unit records and analysis • Input costs of other highway managers or standard costs identified in literature review • Interviews with other highway managers
Program Design and Delivery			
8. Are the governance structures, processes, and resources for	13. Governance structures are understood and seen to be	<ul style="list-style-type: none"> • Management reports of appropriateness and adequacy of 	<ul style="list-style-type: none"> • Agency financial system for expenditures

highway management appropriate and adequate to achieve the desired outputs and outcomes?	<p>appropriate.</p> <p>14. Resources are sufficient to support program outcomes.</p> <p>15. Highway budgets are sufficient to meet obligations without impacting on other areas of mandate delivery.</p>	<p>structures, processes and budgets</p> <ul style="list-style-type: none"> Expenditures on operations/ maintenance and recapitalization as a percentage of the replacement value of the assets Displacement of funds from other activities to the highway program Highway expenditures as a portion of the overall business unit's budget 	<ul style="list-style-type: none"> Assess management literature for standards Key informant interviews
9. To what extent are activities and outputs guided by and in conformance with relevant standards?	16. Standard for performing activities (e.g., construction standards) or producing outputs (e.g., snow removal) are articulated, publicized, and compliance is monitored.	<ul style="list-style-type: none"> Existence of policies or directives related to standards or standard setting Extent standards balance considerations of risk and costs 	<ul style="list-style-type: none"> Key informant interviews Document and file review
10. Are there reasonable and practical alternative delivery models for through highways management?	17. Management has considered different program delivery options and tailored these so they are relevant responses to goals and obligations.	<ul style="list-style-type: none"> Existence of delivery options The extent to which management has explored alternative options and has adjusted delivery to particular circumstances 	<ul style="list-style-type: none"> Literature and document review Managers Survey Interviews with managers Case studies

APPENDIX D: KEY DOCUMENTS REVIEWED**Legislation**

(1998). *The Parks Canada Agency Act*, <http://www.canlii.org/ca/sta/p-0.4/whole.html>

(2000). *The Canadian National Parks Act*, <http://laws.justice.gc.ca/PDF/Statute/N/N-14.01.pdf>

Parks Canada Documents

Parks Canada, (1994) *National Roads Strategy*

Parks Canada, (1994) *Options Analysis for the Operation and Management of Roads - Alberta and Pacific & Yukon Regions*

Parks Canada, (1986) *Parks Roads Winter Maintenance Standards*

Parks Canada Agency, (1999-2004 to 2010-15) *Corporate Plan*

Parks Canada Agency, (2000-01 to 2008-09) *Annual Reports / Performance Reports*

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Other Federal Government Documents

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CASE STUDY ANNEX

The cases studies were meant to explore in more detail cases where alternative service delivery models were employed. For this reason, Forillon NP and Wood Buffalo NP were chosen because of the delivery of the operations and maintenance by a provincial or territorial partner, one through a fixed cost per km model (Forillon), and one that is cost-recovery (Territory). The HSC was chosen to explore this unique centralized delivery model where several field units are grouped to pool certain resources, thereby creating efficiencies.

FORILLON NATIONAL PARK

Forillon, a national park created in 1970, is located at the farthest reach of the Gaspé Peninsula in the province of Quebec. Its landscapes cover a 244-km² area that is carved out of the sea, cliffs and mountains. Forillon protects a representative sample of the Notre-Dame and Mégantic mountain regions and certain elements of the Gulf of St. Lawrence marine region.

Climatic conditions have an impact on the roads. Conditions within the Gaspésie region are harsh, as the region receives on average 380 centimetres of snow from October to May, and average accumulations of precipitation totalling more than 1100 millimetres annually. The temperatures vary from an average -11.9 °C in January to an average 16.6 °C in July.

Information on the highway

As illustrated below, the 132 Provincial route (called la Laurencelle within the NP) surrounds the entirety of Forillon NP, and is within the Park area one section (in pink), for which Parks Canada has the responsibility to operate and maintain. This section represents a total length of 10.5 kilometres, all of which is considered as in poor condition.



It is estimated that 260,000 cars travel yearly through Forillon NP from May to October. In the last five years, there was on average more than 135,000 visitors that used the facilities of the park. Just outside of the western boundary of the park, route 197 is a short 19 km two-lane

highway that cuts through the Appalachian Mountains and goes directly to the municipality of Gaspé (population: 14,819). It was recently upgraded by the provincial government, and its main function is to act as a shortcut to Route 132 for local users, and it is estimated to reduce through traffic in the park significantly.

About the agreement

Prior to the creation of Forillon NP, the 132 was already in place and operated and maintained by the province for the most part. At the park's creation, Forillon NP and the Province of Québec entered into a contractual agreement to have the province continue to maintain and operate the road. As such, the park never assumed the maintenance role of its through highway and did not have to invest important sums into the expensive machinery and staffing required to do this work.

Under the agreement, the Province agrees to operate and maintain the roads identified in the agreement in a state that is equivalent to the adjoining provincial roads to ensure the safety and the comfort of the users. Summer operations include asphalt repairs, patching, brushing, signalization, culverts, guardrails, and traffic line painting. Winter operations consist of snow and ice removal, including the use of salt and abrasives to ensure proper road conditions. Also within the contract is the summer maintenance of less than 2 kilometres of internal roads.

Financial elements of the agreement

Each year, an addendum is signed by both parties to reflect the new rates per kilometre for both the summer and winter rates. The latest addendum signed (41th) was to cover the 2009-2010 fiscal year. Annual expenditures have increased from \$126,000 in 2004-05 to \$138,000 in 2009-2010. The contract is set up based on a given rate for summer maintenance (around \$4,000 per km) and a winter maintenance rate (around \$8,500 per km). Since the mid 1990's, the prices have increased yearly by an inflation factor of around 2%.

Recapitalization of the Laurencelle Road was identified in the 2008-09 Business Plan, but sat in the unfunded category, with an amount of \$5M attributed for 2011-12. In the latest round of LTCs, it was removed from the plan. Because no recapitalization mechanisms are identified in the agreement and the Park does not align its capital planning on the province's, it is at risk at becoming the poor neighbour in the provincial network with sub-par conditions. This can already be witnessed as the province is currently raising the level of its highways across the region, and the Park will likely see the gap widening between the condition of its road compared to the provincial one right next to it.

Benefits of the agreement

This agreement is a benefit to both parties as they know in advance what the costs to maintain the roads are, and given the yearly amount is fixed, there are no surprises if snow precipitations are more than expected, and there are no cutbacks on summer maintenance when this happens.

Furthermore, both parties have indicated that the arrangement is working well and is a benefit for them. With the agreement, the Park estimates it was able to save on startup and yearly costs that could have gone well over the million dollar mark if they would have needed to buy the new

equipment/machinery, materials, storage facilities and staff to deliver the maintenance of the 10.5 kilometres La Laurencelle Road.

The Province feels that with this agreement, it is able to ensure a consistent and seamless road surface condition on its provincial network, because it is following the same standards outside and within the national park. Also, the province already has the expertise, the machinery, and the facilities, and an added 10.5 kilometres to maintain is not a major endeavour when it is in the middle of two areas already under its care.

Concluding remarks

Given the relative small size of the throughway within the park boundaries, 10.5 kilometres, its location within the provincial highway network, and its remoteness to other NPs, and the length of its internal roads, it proves to be reasonable and beneficial to both the park and the province that the administration of Forillon NP entered in an agreement for the province to operate and maintain its through highway. The only issue identified with the current agreement is the absence of a mechanism for the recapitalization of the road, which could allow the park to benefit from the economies of scale of the province, as well as insure the road quality continuity for the users.

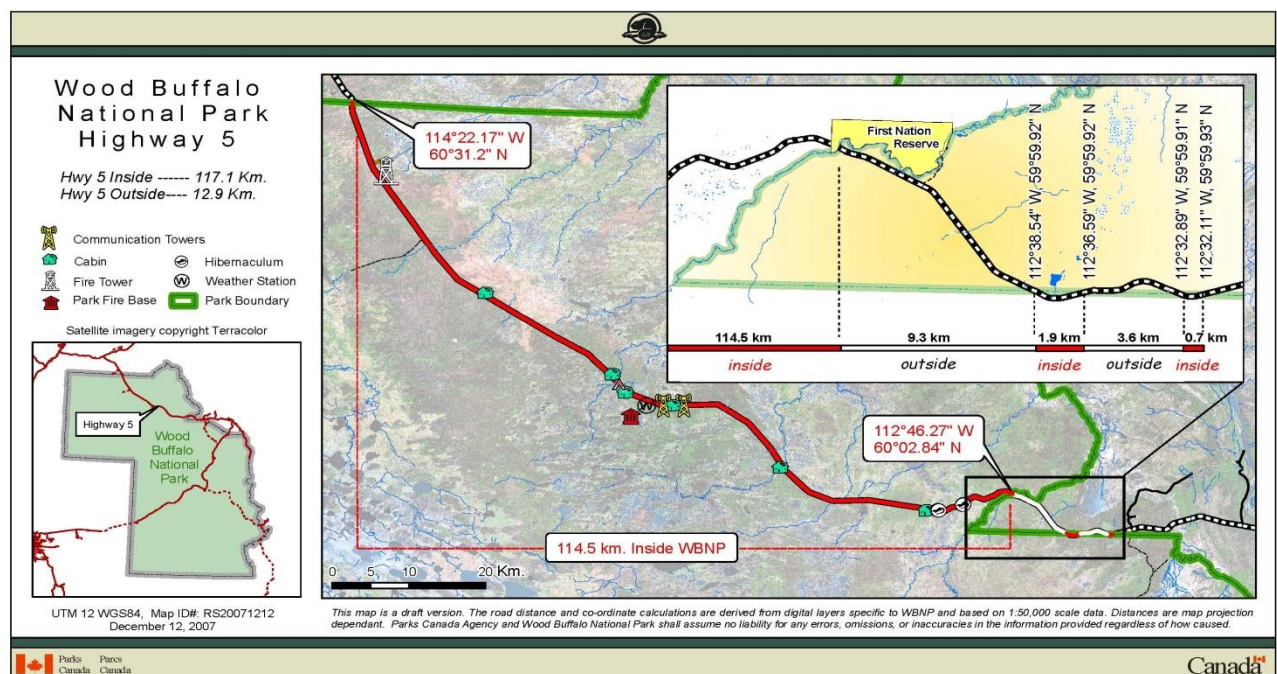
WOOD BUFFALO NATIONAL PARK

As part of Canada's system of national parks and national historic sites, Wood Buffalo National Park of Canada is the country's largest national park and the second largest in the world, with 44,807 km². It was established in 1922 to protect the last remaining herds of bison in northern Canada. Today, it protects a representative example of Canada's Northern Boreal Plains.

Climatic conditions have a significant impact on the roads, and conditions around Fort Smith are unique, with temperatures varying from an average -24.1 °C in January to an average 16.5 °C in August. Accumulations are few, with an average of 151 centimetres of snow yearly, and average accumulations totalling more than 350 millimetres annually. Furthermore, the unique karst geology and topography of the area also influence Highway 5 maintenance. The dynamics and instability of underlying karst formations along the highway has and will continue to lead to sinkholes and sub-surface voids requiring additional precautionary due diligence in detection (e.g., ground penetrating radar), mitigation and maintenance.

Information on highway

Highway 5, known more commonly as the Fort Smith Highway, was completed in 1966, and travels through Wood Buffalo National Park, connecting Fort Smith to Hay River. Of the 267.5 kilometres of Highway 5, 117.1 kilometres are within the boundaries of Wood Buffalo National Park for which Parks Canada has responsibility over. Almost the entire highway within the National Park is a hard-packed gravel and clay surface, whereas it is chip sealed¹⁷ / paved surface on either side of the park (the territorial lands).



¹⁷ Spray application of asphalt on an existing surface, followed by a cover of rock chips or screenings to function as a seal coat.

It is important to note that this is the only all-season road to Fort Smith, the fourth largest community in the Northwest Territories (NWT) with a population of more than 2,300 residents, and is used to bring all commodities in town such as fuel, groceries, and merchandise. Based on the latest data provided by the Government of NWT (GNWT), the average annual daily traffic on HWY 5 on the eastern boundary of the park (25 km west of Fort Smith) is 130 vehicles.

The quality of Hwy 5 within WBNP has deteriorated, and the condition of the current gravel road surfaces requires base layer improvements to meet standards for traffic speed and volume. As of April 2010, GNWT is in year two of a 3 year project to resurface 44 km of the gravel section within WBNP to chip seal, specially funded by GNWT. By summer 2011 this will leave 64 km within WBNP as the only gravel portion of the highway between Fort Smith and Hay River.

About the agreement with the Northwest Territories

Since formation of the NWT in 1968, the federal government has gradually transferred responsibility for operation and maintenance of this thoroughfare to the territorial Department of Transportation. Under a 1969 engineering services agreement, the GNWT may invoice the federal government for all expenses incurred on roadway maintenance within WBNP by providing justification. However, prior to fiscal year 2008-09, GNWT had not requested reimbursement for any services provided on Highway 5 – capital or operating.

With increasing rationalization of costs and efforts to upgrade and chip seal its road network, the GNWT decided to seek an agreement with Parks Canada to recoup the costs for the operations and maintenance of the 117.1 km of HWY 5 that fell within the boundaries of WBNP. In an effort to determine an appropriate and mutually agreeable dollar value for services, GNWT and PCA entered into negotiations on a maintenance agreement in 2007; however, negotiations stalled and no agreement was reached.

Without an agreement, the GNWT provided in 2008-09 for the following highway maintenance components on WBNP's part of HWY 5: regular inspections, maintenance and rehabilitation, engineering services, contract work, scheduling, supervision and administration of the work, delivery of road materials, provision of emergency highway services and repairs, and the operation and supervision of a comprehensive safety program. With the gravel base, the road requires a lot of work and resources during the summer to ensure proper grading, and for the application of calcium chloride for dust suppression. Essentially, the GNWT treated this road as any road within its territorial network.

Financial elements of the agreement

With negotiations not actively underway, the GNWT treated the 2008-09 fiscal year as a transition year, where both parties contributed to the operation of Highway 5. Near the end of the year, after engaging external consultants and reviewing GNWT internal accounting, WBNP offered lump sum contribution amounts of \$800k for the O&M and \$250k for the capital costs for that year, which the GNWT accepted. Department of Justice officials determined there were not adequate records to enter a long-term agreement, so it was decided to use a Memorandum of Understanding (MOU) in 2009-10, where the cost of the O&M was invoiced to WBNP with complete details of the costs, labour, equipment and materials.

This MOU should provide valuable information and increased PCA confidence in values by allowing them to review detailed invoices and performance quality from GNWT for the following years, based upon services rendered at unit prices. PCA funds the activities through Budget 2005 allocation (of \$1M). It must be noted that prior to 2008, WBNP had average expenditures of \$150k from its base budget for all internal roads, such as the ones to Pine Lake and Peace Point, and that it was never meant to cover for HWY 5.

WBNP currently does not have the equipment, staff and financial resources to assume the full maintenance of this road independently. Capital funding still remains under the care of the WBNP. As the only portion of the road that remains gravelled, some users have indicated their dissatisfaction. It is recognized as a principal deterrent in increasing RV-based tourist visits to WBNP.

Several studies have taken place. Private sector consultants determined a long-term cost detriment to continue with status quo maintenance without any future improvement to the existing roadway. PWGSC was contracted to conduct a site assessment and cost estimate, considering the relevance of the prior life cycle cost calculations and current construction plans. The report, completed in 2010, indicated that costs estimates to recapitalize the remaining 64 km to acceptable quality would be of \$21M for gravel and \$25M for chip seal. We were told by PCA that future decisions on continued gravel maintenance or hard-surfacing the remaining 64km through WBNP have to take into account that the vast majority (>90%) of users are not Parks related but use this highway as the sole transport corridor in and outside of Fort Smith. Furthermore, maintenance costs for gravel and chip seal surfaces are approximately equal for the 115 km within WBNP, and can be estimated at \$880k per year, which does not include depreciation or administrative costs.

Benefits of agreement

Both parties have indicated that the operations and maintenance work is being well done and the relationship is amicable between them. They have also both indicated that they were interested in finding a long-term, stable agreement. Discussions have been taking place for about a year on this issue.

The real challenge lies in the current unfixed costing of the agreement, and the need for the WBNP to secure funds to cover costs that, until a couple of years ago, were nil. GNWT costs for operations and maintenance have continued to increase from the original \$1.0M in 2008-09 to \$1.2M in 2009-10 and \$1.3M in 2010-11. Furthermore, WBNP is seeking a full costing exercise to properly forecast its future costs and ensure value for money. The GNWT is eager to recover all the costs associated with the work done in WBNP.

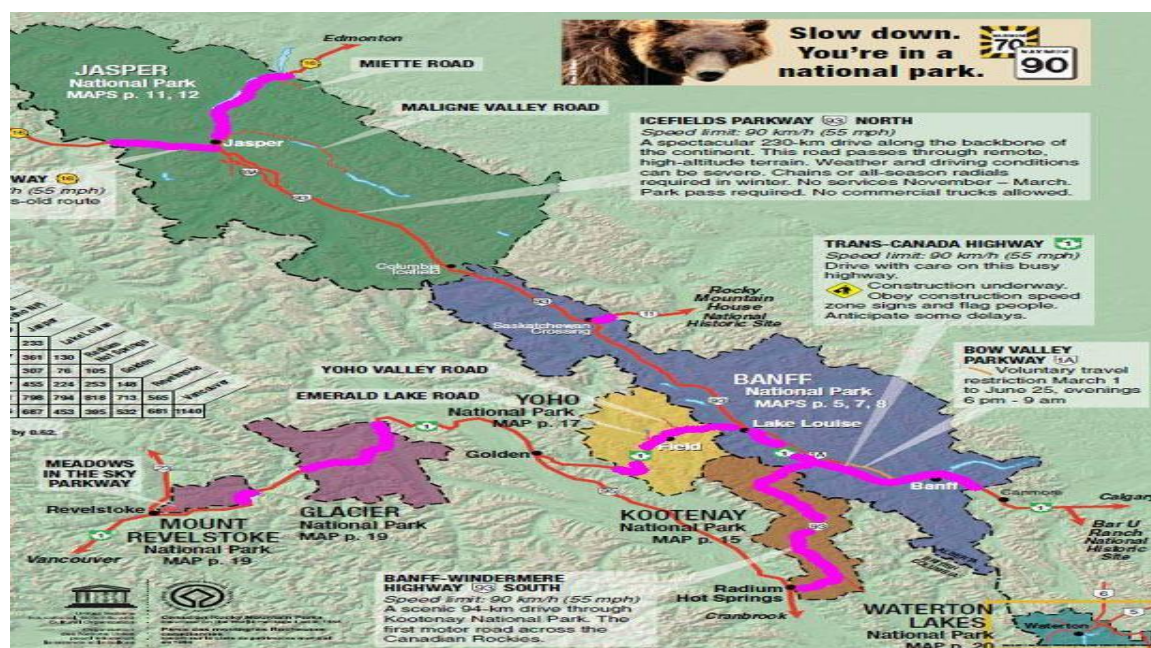
Concluding remarks

This current arrangement can facilitate adequate care of the road for the short term. Both organizations are eager to reach an agreement, and to that end, a joint GNWT-WBNP Highway 5 maintenance committee will be reviewing and authorizing all potential work and costs as part of 2010-11 work planning.

THE HIGHWAY SERVICE CENTRE

The HSC is an entity that works as an independent field unit. It has responsibility for operational maintenance and management of recapitalization projects of all highways and roads, solid waste collection, and associated fleet within and on behalf of Mountain Park Field Units: Mount Revelstoke and Glacier FU, Lake Louise /Yoho/ Kootenay FU, Banff FU, and Jasper FU, as well as capital projects oversight for Waterton Lakes NP. The area is shown on the map below.

These parks are located on either side of the Alberta – BC boundary, with Banff, Jasper, Kootenay and Yoho NPs all being contiguous, and Glacier and Revelstoke NPs being a further 80 kilometres west of Yoho NP. Waterton is more isolated from this network, being more than 300 kms away from the closest NP. Climatic conditions vary significantly in the Canadian Rockies from one area to another, depending on the altitude and topography. For example, Banff receives on average 234 centimetres of snow annually, whereas Roger's Pass receives 932 centimetres. Average total accumulations for Banff are 472 millimetres, and Roger's Pass has more than triple of that with 1547 millimetres annually.



Information on highway and responsibilities

The HSC was established in 1994 following the National Road Strategy and an options analysis. These reports had found that the road management and operations, segregated by FU, had varying levels of services, standards and practices. Highlighted in the reports were also the competing priorities for limited budgets that resulted in different decisions from park to park. Finally, they had identified significant duplication across regions in equipment, personnel and material, because park boundaries do not correspond to effective road maintenance units from a geographical perspective. Before that, each field unit had their own crews, equipment and materials to operate and maintain their internal roads and through highways.

With a staff compliment currently of 107 FTEs as permanent employees and an additional 33 FTEs as seasonal employees, the HSC now services the following six national parks: Banff,

Jasper, Kootenay, Yoho, Mount Revelstoke and Glacier. Within these parks, the HSC has responsibility for 374 route kilometres¹⁸ of through highways, which has an estimated replacement value of three-quarters of a billion dollars. This includes the TCH, Highway #16 and Highway 93 South. Overall, 86% of the highways are considered to be in poor to fair condition.

HSC also has responsibility for an additional 759 km of parkways and internal park roads. Furthermore, HSC has to take care of associated highway structures such as more than 200 bridges, retaining walls, snowsheds, Texas gates, wildlife crossing structures, salt sheds, avalanche control assets, garage tools, and 90 kilometres of fencing. Finally, HSC has dedicated staff to provide engineering advice and assistance to Western Canada field units, and to develop and deliver capital projects in house.

5.8 million vehicles use Mountain Park highways and roads per year and traffic volumes increase on an average by 1% annually. In the area, the Trans-Canada Highway goes through four national parks and is the main transportation corridor through the Rockies. As such, it gets a variety of users: long distance haulers, commuters, tourists. 4 to 6 fatalities occur and over 125 major accidents are registered by the RCMP each year on average.

Financial elements of the arrangement

In 2008-09, the HSC had an A-Base budget of \$15 million, comprised of \$6.9M in salaries and wages, \$8.1M in goods and services, and an additional \$660k derived from Mountain Parks revenues. Of these amounts, more than 50 percent are budgeted under the through highway program activity. For fiscal year 2008-09, the budget had been increased by \$940k to address increased goods and services costs experienced as a result of the inflation. As well, in response to Mountain Parks Field Units' requirements, \$500k was provided to improve levels of summer maintenance for internal park roads and day use areas. This results from the fact that, historically, HSC has had a winter season focused operation with summer activities undertaken dependant on the remaining funding available.

On the capital side, the organization has an A-Base capital budget of \$386k annually, which is viewed as insufficient by the HSC. To offset this low amount, the HSC has been able to tap in various funding opportunities such as from Budget 2005, TCH Twinning, and the Asia-Pacific Gateway and Corridor Initiative. This allowed HSC to carry out activities such as the twinning of the TCH from Banff to Lake Louise, rehabilitation of bridges, buy new equipment and fleet, do emergency repairs, etc.

Under the latest long-term capital funding (2010-11 to 2014-15), funded projects that regard through highways represent \$196M. About \$172M is specifically for the paved infrastructure, \$16M for the bridges, and \$8M for other elements such as equipment and salt shed. Furthermore, there is an additional \$51M for the same time period identified as unfunded projects for further structural rehabilitation of bridges, snow sheds, and pavement.

¹⁸ A route kilometre is the length of road measured by a vehicle traveling from one end to the other, regardless of the number of lanes over this segment.

Benefits of the agreement / arrangement

Currently, the HSC and the Province of British Columbia have a partnership through a MOU for the exchange of maintenance areas. To ensure a more efficient operation for both parties, the HSC plows an equivalent length of road on BC land west of Glacier NP in exchange for a similar length that is in Revelstoke NP. As such, both parties can do continuous segments without having to lift their plows and go to another area, also benefitting users of the road. BC and HSC also collaborate on areas such as dissemination of information, gravel supplies and avalanche control.

In Alberta, there is no such exchange of road maintenance areas, as the national parks are contiguous. Furthermore, there is no coordination with regards to the snow plow operations between HSC and the province, and some users have indicated that this can be an issue when coming in early in the morning by the Banff NP East Gate.

One of the key factors behind the creation of the HSC was to generate economies of scale of more than \$1 million. Staff have indicated to us that the intent was to reinvest these sums into the highway activities, but they never materialized as they were taken away in the program reviews.

One of the advantages of the HSC is to have one group manage the roads where there were four field units before. As such, decisions are taken with the mountain park network in mind. Furthermore, other field units in western Canada are able to benefit, as was the case when speed plows were bought last year and Riding Mountain NP, in Manitoba, was able to join in the group purchase and benefit from the savings.

Concluding remarks

Ultimately, in the case of the HSC, the Mountain Parks have benefited from the centralization of the highways and road functions. That has allowed the organization to have a more efficient, polyvalent and streamlined operation, with better utilized expertise and equipment where borders have fallen. Costs for these operations are therefore better shared across the parks and where smaller, less efficient operations existed, reorganization and consolidation of the areas have allowed the creation of efficiencies.