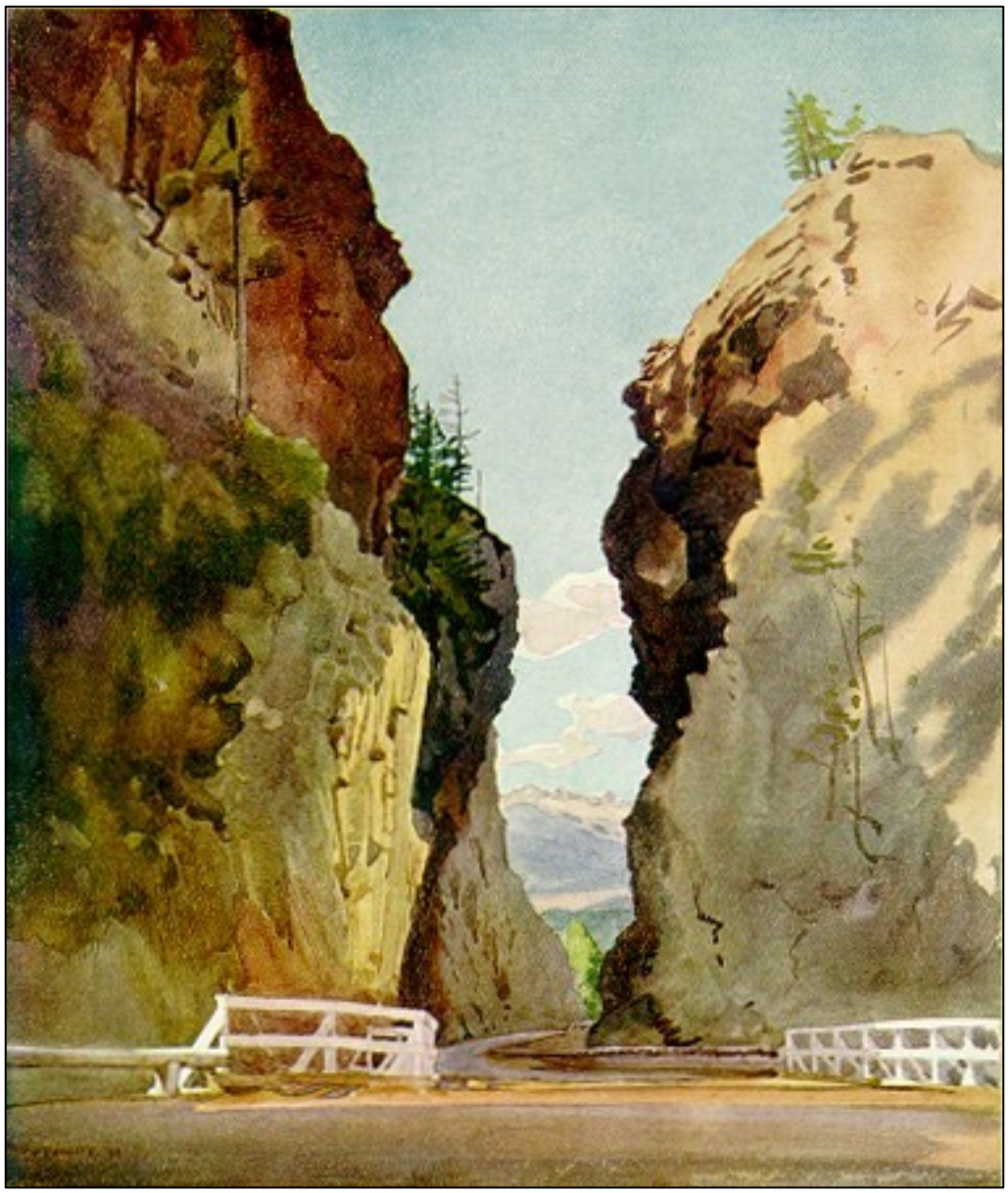
Kootenay Parkway Traffic Projection Study
A Report Prepared for Parks Canada



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Report prepared by:
Meredith Hamstead, MEDes., CEPIT and
Hillary Page, MSc., RPBio.

Rocky Mountain Environmental Design
PO Box 2455
Invermere, BC
V0A 1K0
250.342.7555
merham@cyberlink.bc.ca

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Rocky Mountain Environmental Design

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Executive Summary

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Introduction

This report was commissioned in order to assist Parks Canada to understand the historical patterns of traffic volumes on the Kootenay Parkway and how those patterns may change in future. Specifically, the report outlines:

- Population and development trends in the area of influence for the Parkway;
- Traffic volumes and types on the Kootenay Parkway; and
- Estimates of potential development and traffic growth in the future.

Section 1. Methodology

The terms of reference for this study established an area of influence for the Kootenay Parkway broadly defined as "Calgary and Alberta", and "the Upper Columbia Valley from Canal Flats to Golden". As a result of the preliminary review of the data, the area of influence was further refined to include the "Upper Columbia Valley" in British Columbia and the "Calgary Region" in Alberta.

That portion of the East Kootenay commonly known as The Upper Columbia Valley corresponds approximately to the Regional District of East Kootenay rural Area F. The Upper Columbia Valley encompasses the municipalities of Radium Hot Springs, Invermere, and Canal Flats, and all of the unincorporated communities between Radium and Canal Flats along Highway 93/95, and west to Panorama Mountain Village.

The Calgary Region "…encompasses Southern Alberta communities from Banff in the West to Hussar in the east and from Olds in the north to Nanton in the south" (Urban Futures, pp 1). It is reasonable to assume that only a portion of the Calgary Region poses a significant influence on the KNP Highway. However, in the absence of a detailed analysis of the B.C. Assessment tax roles, the Region serves as is an administratively recognized area (Calgary Regional Partnership) that includes those communities most typically represented on property tax roles in the Upper Columbia Valley.

Three primary types of data were reviewed for this research, including historical traffic data, historical and projected population data, and historical and projected residential development data.

Traffic data was supplied by Parks Canada. The data came from traffic counter number 10300701 located 6.1 kilometers south of the intersection of Highways 1 and 93S at Boom Lake. This research reviewed annual, monthly, and hourly vehicle counts, and classifier data for vehicle class and speed.

Historical population data for the Upper Columbia Valley was sourced from Statistics Canada Community Profiles from 1996, 2001, and 2006 (Statistics Canada. Community profiles. Internet access). No reliable population projections are available for the Upper Columbia Valley.

For the Calgary Region, both historical and projected population data was sourced from an Urban Futures report written for the Calgary Regional Partnership (Urban Futures, 2008).

Historical development data for the Upper Columbia Valley was compiled from Statistics Canada Community Profiles and from personal communications with the development services departments of each of the governing bodies in the geographical area of influence for the Kootenay Parkway.

Development projections data for the Upper Columbia Valley were provided by development services staff at each of the governing bodies in the geographic area of influence for the Kootenay Parkway. No development data was gathered for the Calgary Region.

The primary purpose of this study is to project traffic volumes on the Kootenay Parkway. In order to do so, a regression analysis was conducted on the relationship between traffic volume increases and, population growth in the Upper Columbia Valley; population growth in the Calgary Region; and development growth in the Upper Columbia Valley. The results of this analysis are presented in Section 3.

Section 2. Population and Development Data

In the period from 1996-2006, the population of the Calgary Region grew by 32% from 936,758 to 1,239,626. (Urban Futures, 2008.) During this same period, the Upper Columbia Valley

population grew by 18% from 6,259 to 7,376 (Statistics Canada Community Profiles) while the number of residential units is estimated to have grown by approximately 80%.

Looking forward, The Calgary Region and the Upper Columbia Valley will likely continue to experience rather different population and development growth patterns. In general, the Calgary Region will see growth in the resident population with an associated "normal" growth in housing starts. This can pattern can be characterized as "*More people. More houses"*.

In the Upper Columbia Valley, however, the pattern will likely be quite different. Resident population growth will likely be comparatively minimal, and may even begin to decline, as has been the case in similar communities elsewhere. The total number of housing units, however, is projected to rise by over 400% in some Upper Columbia Valley communities over the next 15 years and rates of non-resident (largely Calgary Region) property ownership may grow to be as high as 95% in some communities (Read, 2008.). This growth pattern can be characterized as "*More houses. Less people*." (see Tables 5 and 6 for details). In the absence of reliable data for population projections for the Upper Columbia Valley and for historical and projected development data for the Calgary Region, these have not been included in our study.

Table 2.
Population Growth, Upper Columbia Valley and Calgary Region, 1996-2006

	Upper Col. Valley	Calgary Region
1996	6,259	936,758
1997	6,367*	968,908
1998	6,474*	1,005,047
1999	6,582*	1,034,029
2000	6,689*	1,061,994
2001	6,797	1,089,147
2002	6,913*	1,117,849
2003	7,029*	1,138,743
2004	7,146*	1,161,048
2004	7,262*	1,194,149
2006	7,376	1,238,626
% increase 1996-2006	**18%**	**32%**

Table 3.
Growth in UCV Dwelling Units 1996-2006

Upper Columbia Valley	
1996	2,868
1997	3,081
1998	3,261
1999	3,476
2000	3,795
2001	3,957
2002	4,165
2003	4,421
2004	4,748
2005	4,933
2006	5,164
% increase 1996-2006	80%

The baseline projection for the Calgary Region indicates that while population growth may decline from the current 20 year high of 3.6% per year to less than 1% per year by 2076, the *total* population in the region may grow to 2.9 million people (Urban Futures, 2008. pp18.). In the "good economic times" (high growth) scenario, the population in the region could double as soon as 2040, and reach 3.2 million people by 2076. In the "hard economic times" (low growth) scenario the population would double by 2050, and grow to 2.7 million people by 2076. In all three models, the Calgary Region population is projected to reach approximately 1.6 million by 2016 (Urban Futures, 2008. pp33.).

For the Upper Columbia Valley, the past does not provide a reliable guide to future growth in residential housing starts. A review of projected development to 2020 and beyond in each of the Village of Radium Hot Springs, the District of Invermere, and the RDEK Area F indicates that housing starts will far outpace both past development rates and resident population growth rates.

In sum, the development projections data for the Upper Columbia Valley indicate the potential for a threefold increase the next 13-20 year period, for a total of 15,353 residential and recreational properties. Significantly, it is estimated that up to 80% of all residential properties in Area F will be owned by non-residents. It can be expected, barring unforeseen events, that the vast majority of these will be owned by Calgarians first and Albertans second.

There is another class of resort development that may have a dramatic effect on the demographic and development landscape of the Upper Columbia Valley and the wider region. Resort proposals that do not yet have land use approval such as Jumbo Glacier Resort, the Fairmont Development Group expansion, and Grizzly Ridge, are nevertheless, an important part of the long-term planning horizons for all levels of government in the Upper Columbia Valley. Together, these developments, along with some comparatively minor infill developments, have the potential to add an additional 12,000 residential properties to the region, for a total of over 27,000 units. It is unclear where the buying demographic for these properties would originate from, but it is reasonable to assume that, if the Resorts are approved, the majority of visitors and residents would ultimately arrive in the Upper Columbia Valley via the Kootenay Parkway

Table 5. Growth Projections: Residential Development in the UCV							
Community	estimate of % non-resident ownership	2006 existing units	2007 to 2009	2010 to 2015	2016 to 2020+	TOTAL Units	TOTAL New Units
Invermere	62%	1,420	355	789	1,995	4,559	3,139
Radium	89%	631	926	1,364	615	3,536	2,905
Area F	90%	3,113	497	2,101	1,547	7,258	4,145
TOTAL Upper Columbia Valley	82%	5,164	1,778	4,254	4,157	15,353	10,189

Table 6. Growth Projections: Including proposed Resort Development in the UCV							
un-approved potential major developments	95%	0	56	850	10,792	11,698	11,698
TOTAL Potential Extreme Growth	89%	5,164	1,834	5,104	14,949	27,051	21,887

Section 3. Vehicular use of the Kootenay Parkway

Between 1998 and 2007, traffic on the Kootenay Parkway increased steadily by all measures.

Total annual vehicle trips on the Parkway increased by 21% from 743,912 to 926,665 (see Chart 1a. Annual Traffic Totals)[1].

The average number of daily trips on the Parkway increased by 19% from 2032 to 2460 (see Chart 4a. Average Daily Totals).

Traffic increased in all seasons (see Chart 6. Seasonal Traffic Totals).

We plotted data for three Statutory Holiday long weekends from 1998 – 2006[2]:

- Alberta Family Day long weekend in February;
- Victoria Day long weekend in May; and
- Labour Day long weekend in September.

Holiday weekend traffic on the Parkway consistently exceeds daily averages for the associated year, month, and week. By way of illustration, while the average daily total in 2006 was 2460, the Labour Day long weekend in 2006 saw 7093 vehicle trips. In 2006, Labour Day long

[1] Note that traffic totals for 2007 do not include volumes for February, March, or April as the data is not available. Given the limited number of prior years' data, we chose not to average the data for those months. As such, traffic totals for 2007 under-represent actuals.

[2] 2007 was excluded from analysis due to a lack of data points for February, March, and April.

weekend Monday North-bound traffic peaked at over 900 vehicle trips in a single hour. Wednesday traffic in that same month peaked at 101 trips in a single hour.

Vehicle Classifier Data was reviewed for 2002, 2003, and 2007. The 2003 data has been charted but is not statistically valid as the august 2003 highway closure skews the data dramatically.

It is difficult to make generalizations based on 3 data points. However, the speed data seems to indicate that there has been a significant increase in both the 85th percentile and average speeds for daytime travel from 2002 -2007, but not for night time travel. Night speeds tend to exceed day speeds with the exception of October and November (see Charts 26, 27, and 28 – Average Day and Night Speeds and 85th percentiles)**.**

The Parks Canada classifier data is incomplete for the purposes of trend analysis. As a result, the data analysis is highly generalized, does not review trends (increase or decrease in volumes, classes etc…) and should be used with caution and caveat. We were able to chart the data from 2002, 2003, and 2007, for the months of June to November.

Private vehicles remain the primary class of vehicle on the highway, accounting for approximately 84% of total traffic year round. Private vehicles tend to make up a lesser percentage of night time traffic (approximately 78-80%).

During the months of June-September, Recreational Vehicles make up approximately 10-15% of traffic on the parkway. This figure falls to 2-3% in October and November. RVs make up an average of approximately 6-8% of total traffic from June to November.

TTC Trucks make up approximately 5% of vehicles on the Parkway. TTC Trucks constitute approximately 4% of day time traffic, and 10-13% of night time traffic.

RVs tend to make up a consistent percentage of vehicles on the highway during both day and night time hours for the months of June to September. Private vehicles tend to make up a lesser percentage of vehicles in the nighttime hours, with TTC Trucks making up most of the difference. TTC Trucks constitute approximately 4% of day time traffic, and 10-13% of night time traffic.

Future use of the Kootenay Parkway

We conducted a regression analysis on three sets of data in relation to the Parks Canada traffic counter data:

- Calgary Region Historical Population Growth;
- Upper Columbia Valley Historical Population Growth; and
- Upper Columbia Valley Development

(see Charts 32, 33, and 34 – Regressions)

It was determined that the historical relationship between increases in the Calgary Region population and traffic on the Kootenay Parkway for the period from 1996-2006 was significant. As such, population projections for the Calgary Region were utilized to project traffic volumes on the Kootenay Parkway.

It was determined that the historical relationship between increases in the Upper Columbia Valley population and traffic increases on the Kootenay Parkway for the period from 1996-2006 was significant. However, when we attempted to project future traffic volumes based of population projections of between 1.2 and 1.4%/year (same as projection used for the Calgary Region) the results were invalid, as indicated by a decrease in total traffic in the first year. This result is not unexpected as, over time, population growth in the Upper Columbia Valley has slowed (MacNeil, 2007. p12.) while traffic has continued to increase steadily. For this reason, population projections for the Upper Columbia Valley were not reviewed and were not utilized to project traffic volumes.

It was determined that the historical relationship between increases in residential development in the Upper Columbia Valley and traffic increases on the Kootenay Parkway for the period from 1996-2006 was significant. As such, development projections for the Upper Columbia Valley were utilized to project traffic volumes on the Kootenay Parkway.

The tables below have data gaps in order to reflect the differences in reporting points between the Calgary population projections and the Upper Columbia Valley development projections. Also, note that the Upper Columbia Valley data includes a second set that incorporates potential resort development.

Table 7. Calgary Population Based Traffic Projections

	2007	2009	2015	2016	2020	2026	2036	2046	2056	2066	2076
Calgary 1.4% pop. Growth/yr	926,665			1,674,372		1,991,447	2,269,373	2,529,650	2,771,004	2,990,085	3,190,537
Calgary 1.3% pop. Growth/yr	926,665			1,653,152		2,025,798	2,183,414	2,410,276	2,617,538	2,803,790	2,974,367
Calgary 1.2% pop. Growth/yr	926,665			1,651,466		1,915,829	2,131,755	2,328,244	2,504,424	2,659,677	2,799,357

Table 8. UCV Development Based Traffic Projections

	2007	2009	2015	2016	2020
UCV development projections	926,665	1,026,139	1,345,189		1,656,964
UCV incl. resort projections	926,665	1,030,339	1,413,139		2,534,314

Utilizing the Calgary Region population projections, Traffic on the Parkway can be expected to double to over 1.8 million vehicle trips/year before 2026. By 2076, traffic volumes may reach

2.8-3.2 million vehicle trips/per year (see Chart 29. Traffic Projections Based on Calgary region Population Growth to 2076).

Utilizing the Upper Columbia Valley development projections, by approximately 2020, traffic will reach nearly 1.7 million trips/year. However, if all resort proposals in the Upper Columbia Valley are approved and reach full build-out by 2020-2025, this number could rise to 2.5 million vehicle trips/year (see Chart 30. Traffic Projections to 2020 Based on Upper Columbia Valley Development Projections).

Section 4. Gap Analysis

In order to more accurately project the future of traffic on the Kootenay Parkway, a number of data gaps will need to be addressed.

Overall, in order to accurately project traffic volumes, more years of historical data will be required. It is critical that a traffic counter and classifier be in place year round for a number of consecutive years. As discussed elsewhere in this report, the classifier data is too patchy to be useful for the purposes of trend analysis. 10-15 years of continuous classifier data would be required in order to accurately assess trends in vehicle type and speed. These frequent and inconsistent data gaps are present in the length and gap data sets as well. Errors in reporting class data for Bus and SU Truck classes will need to be addressed as well.

Vehicle collision data gathered by ICBC appears to be incomplete. In order to determine the effect of increasing traffic volumes on vehicle safety, more accurate data is required.

It would likely be very informative to survey the non-resident property owners of the Upper Columbia Valley. How many trips to the Valley do they make each year? Do they plan to make more or less trips? How long do they stay? Do they plan to retire in the Upper Columbia Valley? This type of information may allow Parks Canada to determine approximately what percentage of total traffic volumes on the Parkway are Calgary Region based, and which portion is attributable to tourist traffic.

Point of tourist origin data can be very difficult to gather. However, there is a significant opportunity in this regard available in the shared Radium Chamber of Commerce and Parks Canada visitor centre. The Chamber could readily collect tourist point of origin and route of arrival data which would assist Parks Canada to understand where non-resident visitors to the region are coming from.

Introduction

Introduction

This report was commissioned in order to assist Parks Canada to understand the historical patterns of traffic volumes on the Kootenay Parkway and how those patterns may change in future. Specifically, the report outlines:

- Population and development trends in the area of influence for the Parkway;
- Traffic volumes and types on the Kootenay Parkway; and
- Estimates of potential development and traffic growth in the future.

Section 1 reviews the research methodology, including establishment of the geographic area of influence for the Kootenay Parkway, and a summary of the data sets reviewed for the purposes of this report.

Section 2 provides on overview of the development and population data for the geographic area of influence for the Kootenay Parkway. This area includes the Calgary Region in Alberta and the Upper Columbia Valley in British Columbia.

Section 3 reviews the historical traffic use data for the Kootenay Parkway, and attempts to draw some conclusions about future use of the Parkway.

Section 4 presents a gap analysis of additional data that would be required in order to develop conclusions regarding future use of the Kootenay Parkway that would be specifically useful for operational planning purposes.

Section 1 Methodology

Geographic Area of Influence

The terms of reference for this study established an area of influence for the Kootenay Parkway broadly defined as "Calgary and Alberta", and "the Upper Columbia Valley from Canal Flats to Golden". As a result of the preliminary review of the data, the area of influence was further refined to include the "Upper Columbia Valley" in British Columbia and the "Calgary Region" in Alberta.

The Upper Columbia Valley

As noted above, the terms of reference established the area of influence for the Parkway in B.C. as being from Canal Flats to Golden. The preliminary review of data suggested that a refinement of the area of influence was in order.

Those communities north of RDEK Area F, including rural hamlets such as Brisco and Spillimacheen, and the Town of Golden, have been excluded from this study. Development in these rural areas is difficult to assess accurately as it spans two Regional Districts and Rural Areas. Further, development in these communities is insignificant in relation to development within the RDEK Area F and so, would be unlikely to significantly to affect the traffic projections developed in this report. The Town of Golden was excluded as visitors to Golden will more typically travel via Highway 1 than via the south route through the Kootenay Parkway.

That portion of the East Kootenay commonly

known as The Upper Columbia Valley corresponds approximately to the Regional District of East Kootenay rural Area F. The Upper Columbia Valley encompasses the municipalities of Radium Hot Springs, Invermere, and Canal Flats, and all of the unincorporated communities between Radium and Canal Flats along Highway 93/95, and west to Panorama Mountain Village[3].

Within the individual municipalities of the Upper Columbia Valley, the rate of non-resident property ownership ranges from approximately 25% to almost 90%, and these figures are projected to rise substantially over the next 2-25 years.

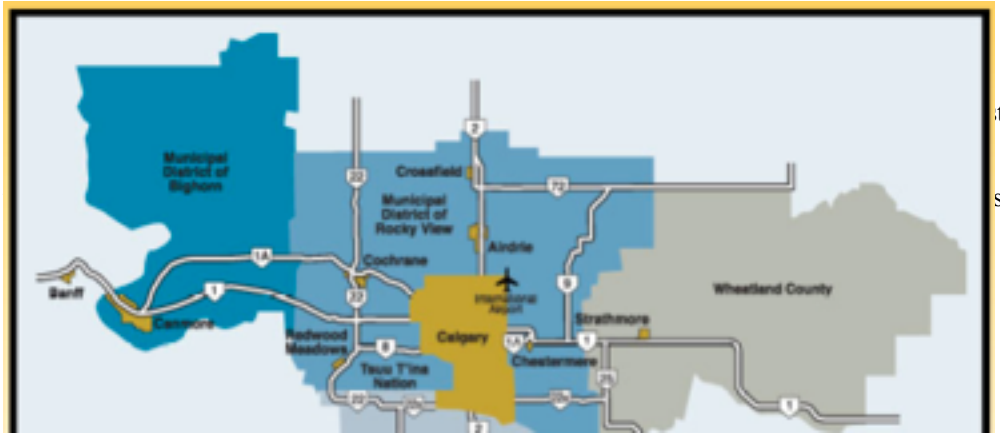
43% of the 1,700+ new properties developed in the Upper Columbia Valley between 2001 and 2005 were purchased by property owners in Alberta (Berlin, 2005.). In the 1989-1996 interval, 60% of purchasers in the Radium/Fairmont area were from Alberta (Pringle, 2006.). In total, in 2005 35% of all properties in the Upper Columbia Valley were owned by Albertans, and more specifically, 26% were owned by Calgarians. The number of Upper Columbia Valley property owners from Alberta exceeds the number of owners from the rest of BC, the rest of Canada, the United States, the rest of the East Kootenay Region, and all government properties[4] combined (Berlin, 2005). These Albertan and Calgarian property owners must generally travel to the Upper Columbia Valley via the Kootenay Parkway. Thus, by assessing the historical and projected development and population growth rates in the Upper Columbia Valley and the Calgary Region, it may be possible to draw some reasonable conclusions regarding future use of the Kootenay Parkway.

Table 1. RDEK Area F Communities	
Athalmer	Rushmere
Columbia Lake	Toby benches
Columere Park	Westside road
Dutch Creek	Whiteswan
Invermere Rural	Windermere
East Side Lk. Windermere	Radium (municipality)
Fairmont Hot Springs	Canal Flats (municipality)
Panorama	Invermere (municipality)

Figure 1. RDEK Rural Areas . (RDEK. 2008.)

The Calgary Region

The Calgary Region "…encompasses Southern Alberta communities from Banff in the West to Hussar in the east and from Olds in the north to Nanton in the south" (Urban Futures, pp 1). It is reasonable to assume that only a portion of the Calgary Region poses a significant influence on the KNP Highway. However, in the absence of a detailed analysis of the B.C. Assessment tax roles, the Region serves as is an administratively recognized area (Calgary Regional Partnership) that includes those communities most typically represented on property tax roles in the Upper Columbia Valley.



torical and projected

sident property owners

A Note on the Geographic Limitations of the Research

The geographic area of influence has been intentionally limited for the purposes of this study. It excludes Canadian property owners who live further north or east of the Calgary Region, own property in the Columbia Valley and who regularly utilize the Parkway. This approach is supported by non-resident property ownership figures discussed above. As a result of a lack of available data, it also does not take into consideration international tourism coming to the Upper Columbia Valley via the Calgary International Airport and the Kootenay Parkway.

Despite the geographical limitation of the area of influence for this study, it is felt that by assessing development and population in the Upper Columbia Valley and the Calgary Region, it is possible to draw reasonable conclusions about future of vehicular use of the Kootenay Parkway. This assertion is supported by the analysis of available historical traffic, population and development data for the selected area of influence (see Section 3).

Data Analysis

Three primary types of data were reviewed for this research, including historical traffic data, historical and projected population data, and historical and projected residential development data.

Traffic Data

Traffic data was supplied by Parks Canada. The data came from traffic counter number 10300701 located 6.1 kilometers south of the intersection of Highways 1 and 93S at Boom Lake. This research reviewed annual, monthly, and hourly vehicle counts, and classifier data for vehicle class and speed. Excluded were classifier data pertaining to vehicle length and gap time between vehicles. Length data were determined to be redundant to the class data.

Note that traffic totals for 2007 do not include volumes for February, March, or April as the data is not available. Given the limited number of prior years' data, we chose not to average the data for those months. As such, traffic totals for 2007 under-represent actuals.

Population data

Historical population data for the Upper Columbia Valley was sourced from Statistics Canada Community Profiles from 1996, 2001, and 2006 (Statistics Canada. Community profiles. Internet access).

No reliable population projection data are available for the Upper Columbia Valley. We have based population projections for the purposes of regression analysis on the average rate of growth over the 1996-2006 period. While population data is the preferred method, we have relied on development data as the primary means of representing growth in the Upper Columbia Valley. As a result of extremely high rates of non-resident property ownership development and population growth figures in the Upper Columbia Valley are not "normally" correlated as they would be in a typical community where residential properties are owned primarily by residents.

For the Calgary Region, both historical and projected population data was sourced from an Urban Futures report written for the Calgary Regional Partnership (Urban Futures, 2008). Historical data in the Urban Futures report were compiled from federal, regional, and municipal censuses, and is used to support long-range planning for both the City of Calgary and the Calgary Regional Partnership (Tucker, 2008).

Development Data

Historical development data for the Upper Columbia Valley was compiled from Statistics Canada Community Profiles and from personal communications with the development services departments of each of the governing bodies in the geographical area of influence for the Kootenay Parkway.

Development projections data for the Upper Columbia Valley were provided by development services staff at each of the governing bodies in the geographic area of influence for the Kootenay Parkway.

No development data was gathered for the Calgary Region. Population projection data is the preferred means of representing growth. In order to accurately represent growth, residential development figures must be calibrated based on the type of unit and the "single family equivalent" number of people in each unit. For example, a high density apartment unit is calculated to house less people, on average, than a single family home. High density units, therefore, must be recalibrated into "single family equivalents" in order to say that X # of units = Y # of people. For this reason, given the availability of reliable population projection data for the Calgary Region, we did not explore development data for the Calgary Region for this study.

Analysis

The primary purpose of this study is to project traffic volumes on the Kootenay Parkway. In order to do so, a regression analysis was conducted on the relationship between traffic volume increases and, population growth in the Upper Columbia Valley; population growth in the Calgary Region; and development growth in the Upper Columbia Valley. The results of this analysis are presented below in Section 3.

Parks Canada's raw traffic data was organized into data sets and graphs for the following:

- Annual totals and averages
- Monthly totals and averages
- Daily averages
- Seasonal totals and averages
- Holiday weekend totals and averages (Family Day, Victoria Day, and Labour Day)
- Vehicle class
- Vehicle speed

Counter Data was complete, and was, typically, reviewed from 1998-2007.

The Holiday weekend data was reviewed from 1998- 2006 as a result of only partial data for 2007 (February, March and April 2007 have no hourly/daily data sets).

The available classifier data is very incomplete[5]. We assessed classifier data for 2002, 2003, and 2007, for the months of June to November. This allowed us to compare the broadest range of data sets for the available data. It is also noted that the classifier data for all available years for October and November appears to incorrectly duplicate figures for the Bus and SU Truck Classes. As such, these classes have not been analyzed. They have been included in the charts as their removal would skew percentages and annual averages for the other classes. Bus and SU Truck class data are, for the purposes of this study, invalid.

Other Data Reviewed

Accident Data was provided by ICBC, but was too generalized to be useful for the purposes of this research, and so, has been excluded from the data analysis[6].

An attempt was made to review tourism data for the Upper Columbia Valley. Interviews were conducted with Staff at the Radium Hot Springs and Columbia Valley Chambers of Commerce. Data provided included visitor counts at the Visitor Information Centers (VICs) in Radium and Invermere. The data, however, is unreliable for the purposes of this research as data were gathered for an inconsistent number of hours each day, and for an inconsistent number of days and months each year. The hours, days and months during which data were gathered also differs at each VIC, and may be duplicative as visitors to the Radium VIC may have also visited the Invermere VIC. Further, no data was gathered by the Chambers of Commerce regarding the point of origin for the visitors, and as such no valid generalizations can be made as to the relationship between the VIC visitor data and traffic counts on the Kootenay parkway. This data has also been excluded from the data analysis[7].

Transport trucking data was supplied by the Parks Canada Trucking Sub-committee. The data is, however, incomplete, was estimated in most cases, was provided for inconsistent time periods for each company, and was inconsistent with the classifier data supplied as the basis for this study. This data has been excluded from the data analysis.

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[5] See Appendix A for a table showing available classifier data.

[6] ICBC provided the following accident data summary: "…from 1996-2007 the numbers of collisions were under 10 for each of those years. Unfortunately we cannot release the exact numbers…" (Brakop, 2008.)

[7] For the purposes of future research, it is noted here that research conducted by the Columbia Valley Chamber of Commerce and the Columbia Basin Trust has established a 2005 baseline of 2216 guest rooms from Fairmont to Radium (including Panorama). These units include hotels, motels, motel condominiums, and bed and breakfasts. No projection or historical growth rate data are available. (Overy, 2008).

Section 2

Population and Development Data

Population and Residential Development

In the period from 1996-2006, the population of the Calgary Region grew by 32% from 936,758 to 1,239,626. (Urban Futures, 2008.) During this same period, the Upper Columbia Valley population grew by 18% from 6,259 to 7,376 (Statistics Canada Community Profiles) while the number of residential units is estimated to have grown by approximately 80%[8].

Looking forward, The Calgary Region and the Upper Columbia Valley will likely continue to experience rather different population and development growth patterns. In general, the Calgary Region will see growth in the resident population with an associated "normal" growth in housing starts. This can pattern can be characterized as "*More people. More houses"*.

In the Upper Columbia Valley, however, the pattern will likely be quite different. Resident population growth will likely be comparatively minimal, and may even begin to decline, as has been the case in similar communities elsewhere[9]. The total number of housing units, however, is projected to rise by over 400% in some Upper Columbia Valley communities over the next 15 years and rates of non-resident (largely Calgary Region) property ownership may grow to be as high as 95% in some communities (Read, 2008.). This growth pattern can be characterized as "*More houses. Less people*." (see Tables 5 and 6 for details). In the absence of reliable data for

[8] Historical development figures are based on a compilation of Statistics Canada Community Profiles data from 1996, 2001, and 2006 for Invermere, Radium Canal Flats, and RDEK Area F (Statistics Canada, Community Profiles. Internet Access), and from RDEK building permit data provided by RDEK development services staff (MacLeod, 2008.). Due to Statistics Canada boundary changes, data are estimated.

[9] For example, Fernie's resident population declined from 4,611 in 2001 to 4,217 in 2006, while the number of dwellings occupied by usual residents grew from 2,368 in 2001 to 2,627 in 2006. (Statistics Canada. Community Profiles.)

population projections for the Upper Columbia Valley and for historical and projected development data for the Calgary Region, these have not been included in our study.

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	Upper Col. Valley	Calgary Region
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Calgary Region: Population

Table 3. Growth in UCV Dwelling Units 1996-2006	
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1996	2,868
1997	3,081
1998	3,261
1999	3,476
2000	3,795
2001	3,957
2002	4,165
2003	4,421
2004	4,748
2005	4,933
2006	5,164
% increase 1996-2006	80%

Projections 2007-2076

The population of the Calgary Region in 2006 was approximately 1.2 million people. Urban Futures has developed growth projections for the Calgary Regional Partnership based on an assessment of three economic growth models, taking into consideration historical and projected demographic and economic factors.

The baseline projection indicates that while the population growth rate in the region may decline from the current 20 year high of 3.6% per year to less than 1% per year by 2076, the *total* population in the region may grow to 2.9 million people (Urban Futures, 2008. pp18.). In the "good economic times" (high growth) scenario, the population in the region could double as soon as 2040, and reach 3.2 million people by 2076. In the "hard economic times" (low growth) scenario the population would double by 2050, and grow to 2.7 million people by 2076. In all three models, by 2016 the Calgary Region population is projected to reach approximately 1.6 million (Urban Futures, 2008. pp33.).

Table 4. Growth Projection Models for the Calgary Region to 2076. (Urban Futures, 2008. pp33.)									
	2006	2016	2026	2036	2046	2056	2066	2076	Avg.

Good times	1,238,626	1,629,153	1,956,034	2,242,556	2,510,882	2,759,701	2,985,558	3,192,209	1.4%
Baseline	1,238,626	1,607,276	1,901,281	2,153,938	2,387,816	2,601,489	2,793,501	2,969354	1.3%
Hard Times	1,238,626	1,605,538	1,878,077	2,100,681	2,303,247	2,484,876	2,644,931	2,788,931	1.2%

Upper Columbia Valley: Development Projections: 2007-2020 and beyond

For the Upper Columbia Valley, the past does not provide a reliable guide to the future of growth in residential housing starts. A review of projected development to 2020 and beyond in each of the Village of Radium Hot Springs, the District of Invermere, and the RDEK Area F indicates that housing starts will far outpace both past development rates and resident population growth rates[10]. The development projections data cited in this report is based on consultation with development services staff for each of the governing bodies responsible for development approvals in the Upper Columbia Valley.

Data from 2007 to 2009 are based on new residential units that have been permitted for construction but have not yet been permitted for occupancy. It can be assumed that all of these units will be occupied by the end of 2009. The degree of reliability for this data is very high.

Data from 2010 to 2015 are based on new units for which land use approval has been granted by the governing body, but for which building permits have not yet been issued. It is probable that these units will be constructed and occupied by 2015. The degree of reliability for this data is moderate.

Data from 2016 and beyond are based upon projections provided to the governing bodies by developers in phasing plans and upon the informed understandings of development services staff in the areas of local real estate markets, regional and international development climates, on-going communications with developers, and the degree of developer investment in development infrastructure. The level of reliability of this data is low as it is highly subject to fluctuations in variables such as the international economy, fuel prices, market absorption rates and market competition.

There is a fourth category of projected development that is highly unreliable, but must be considered as part of a possible extreme growth model. This category includes significant resort development proposals that continue to face major land use hurdles prior to approval, but that are being considered as part of the planning horizon by the various governing bodies of the Upper Columbia Valley. These include Jumbo Glacier Resort, Grizzly Ridge, and the Fairmont Resort Expansion, among others.

Table 5. Growth Projections: Residential Development in the UCV

[10] The two Area F First Nations reserves and Canal Flats have been excluded from this analysis based on a lack of reliable data.

Community	estimate of % non-resident ownership	2006 existing units	2007 to 2009	2010 to 2015	2016 to 2020+	TOTAL Units	TOTAL New Units
Invermere	62%	1,420	355	789	1,995	4,559	3,139
Radium	89%	631	926	1,364	615	3,536	2,905
Area F	90%	3,113	497	2,101	1,547	7,258	4,145
TOTAL Upper Columbia Valley	82%	5,164	1,778	4,254	4,157	15,353	10,189

Table 6. Growth Projections: Including proposed Resort Development in the UCV							
un-approved potential major developments	95%	0	56	850	10,792	11,698	11,698
TOTAL Potential Extreme Growth	89%	5,164	1,834	5,104	14,949	27,051	21,887

In sum, the development projections data for the Upper Columbia Valley indicate the potential for a threefold increase the next 13-20 year period, for a total of 15,353 residential and recreational properties. Significantly, it is estimated that up to 80% of all residential properties in Area F will be owned by non-residents. It can be expected, barring unforeseen events, that the vast majority of these will be owned by Calgarians first and Albertans second.

There is another class of resort development that may have a dramatic effect on the demographic and development landscape of the Upper Columbia Valley and the wider region. Resort proposals that do not yet have land use approval such as Jumbo Glacier Resort, the Fairmont Development Group expansion, and Grizzly Ridge, are nevertheless, an important part of the long-term planning horizons for all levels of government in the Upper Columbia Valley. Together, these developments, along with some comparatively minor infill developments, have the potential to add an additional 12,000 residential properties to the region, for a total of over 27,000 units. It is unclear where the buying demographic for these properties would originate from, but it is reasonable to assume that, if the Resorts are approved, the majority of visitors and residents would ultimately arrive in the Upper Columbia Valley via the Kootenay Parkway[11].

When we analyzed the historical relationship between residential development in the Upper Columbia Valley and traffic volumes on the Kootenay Parkway, the relationship was found to be significant. As noted in the methodology, population projections are a preferred method of representing growth. However, in the absence of reliable population projections data, we feel that the relationship between traffic and the projected increase in residential units will provide the more reliable projection of future traffic volumes on the Kootenay Parkway (See Section 3 for a detailed analysis).

[11] The development of the Cranbrook International Airport may divert some traffic from the Kootenay Parkway, but no estimate figures are available, and it is reasonable to assume that the diversion may be minimal in the foreseeable future.

Section 3

Vehicular Use of the Kootenay Parkway

Historical Use of the Kootenay Parkway

Between 1998 and 2007, traffic on the Kootenay Parkway increased steadily by all measures[12].

Total annual vehicle trips on the Parkway increased by 21% from 743,912 to 926,665 (see Chart 1a. Annual Traffic Totals)[13].

The average number of daily trips on the Parkway increased by 19% from 2032 to 2460 (see Chart 4a. Average Daily Totals).

Traffic increased in all seasons (see Chart 6. Seasonal Traffic Totals).

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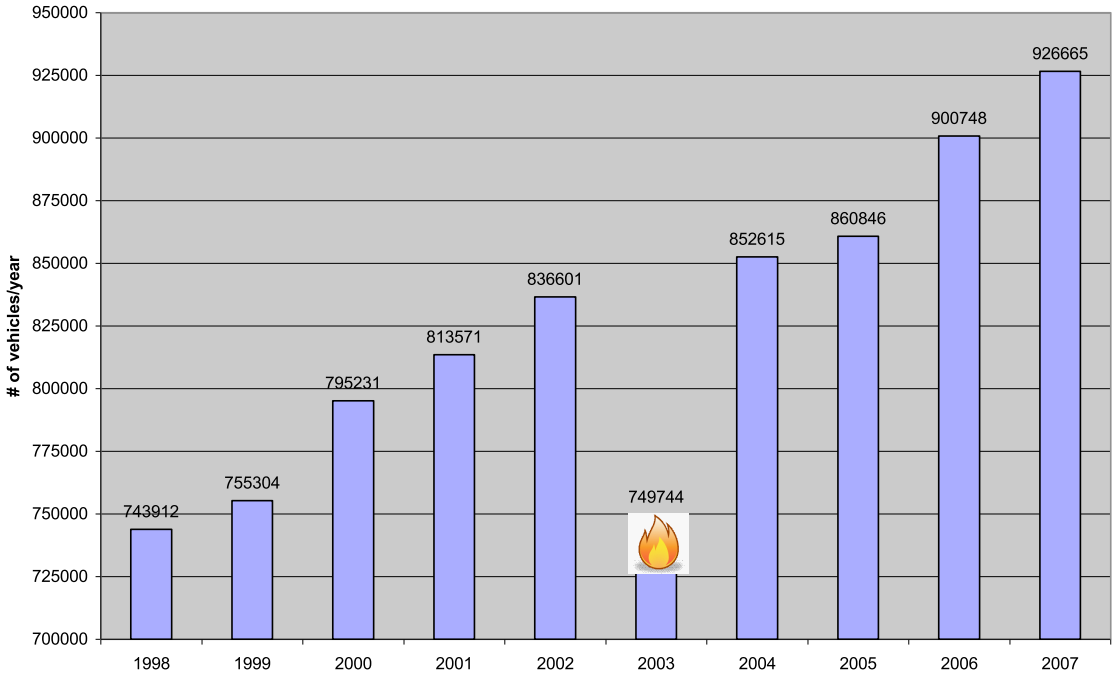
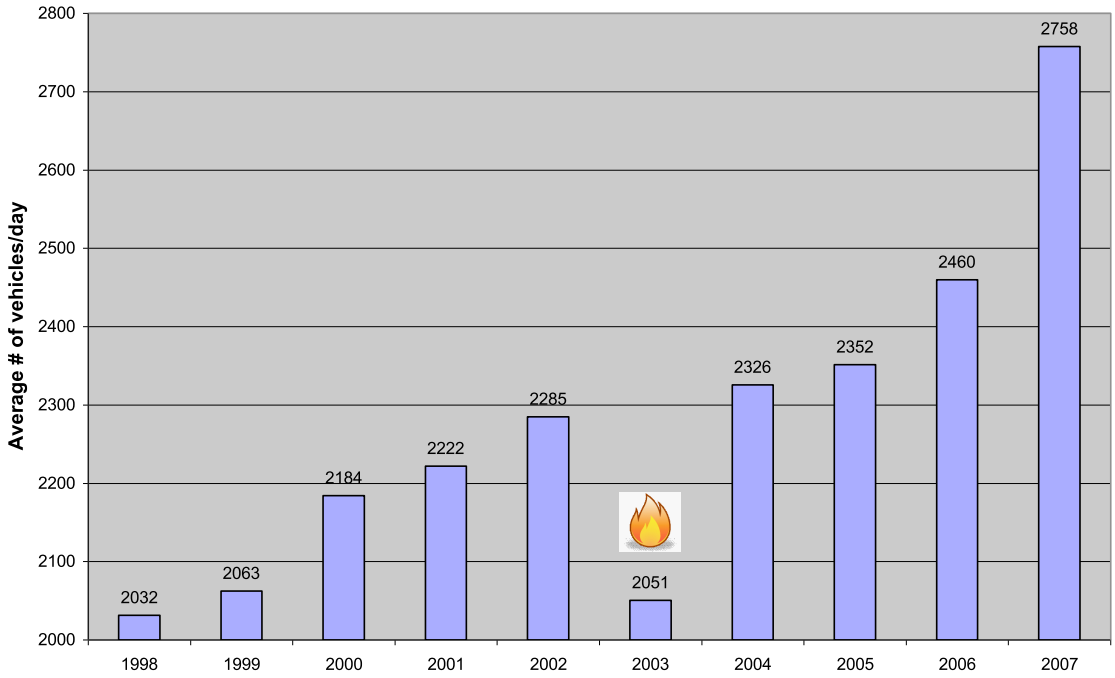
[12]  in charts indicates data affected by 2003 highway closures during August and Early September due to wildfire.

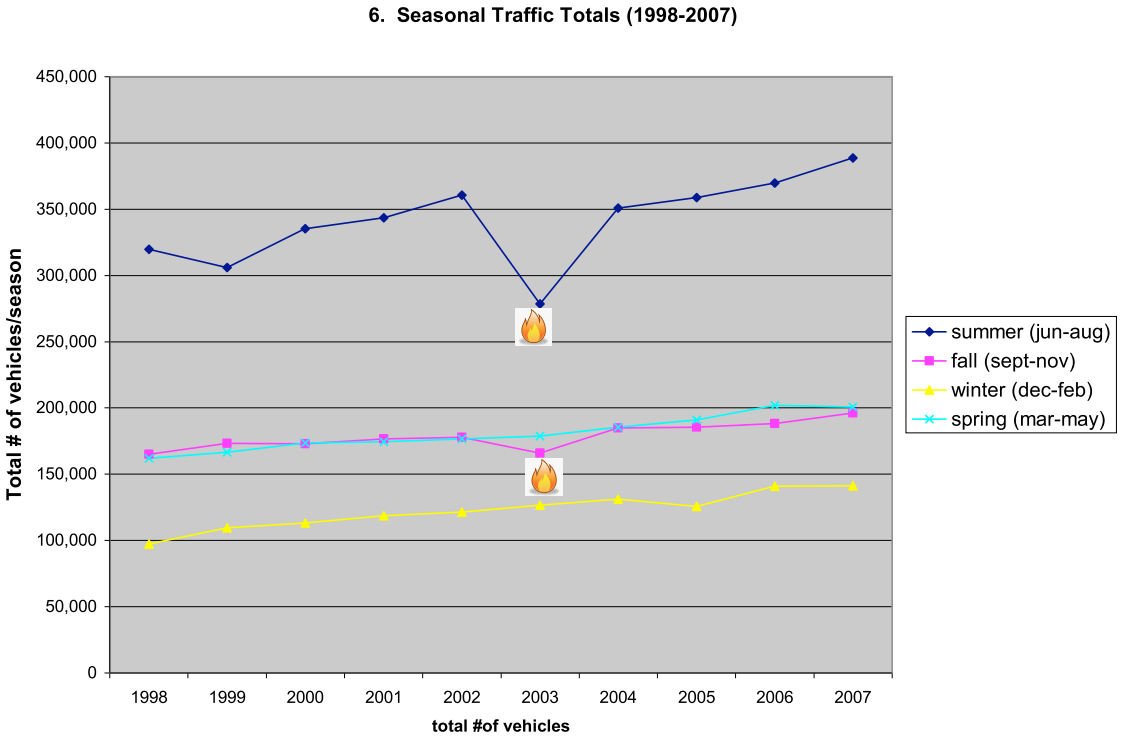
[13] Note that traffic totals for 2007 do not include volumes for February, March, or April as the data is not available. Given the limited number of prior years' data, we chose not to average the data for those months. As such, traffic totals for 2007 under-represent actuals.

1a. Annual Traffic Totals (1998-2007)



4a. Avereage Daily Totals by Year (1998-2007)





Statutory Holiday Weekends

We plotted data for three Statutory Holiday long weekends from 1998 – 2006[14]:

- Alberta Family Day long weekend in February;
- Victoria Day long weekend in May; and
- Labour Day long weekend in September.

For anyone who has traveled the Parkway on a long weekend, there are no surprises in the long weekend volume data. Holiday weekend traffic on the Parkway consistently exceeds daily averages for the associated year, month, and week. By way of illustration, while the average daily total in 2006 was 2460, the Labour Day long weekend in 2006 saw 7093 vehicle trips. In 2006, Labour Day long weekend Monday North-bound traffic peaked at over 900 vehicle trips in a single hour. Wednesday traffic in that same month peaked at 101 trips in a single hour.

As with all other measures, holiday traffic is increasing on the Kootenay parkway. Traffic volumes for each of the long weekends reviewed increased disproportionately between 1998 and 2006.

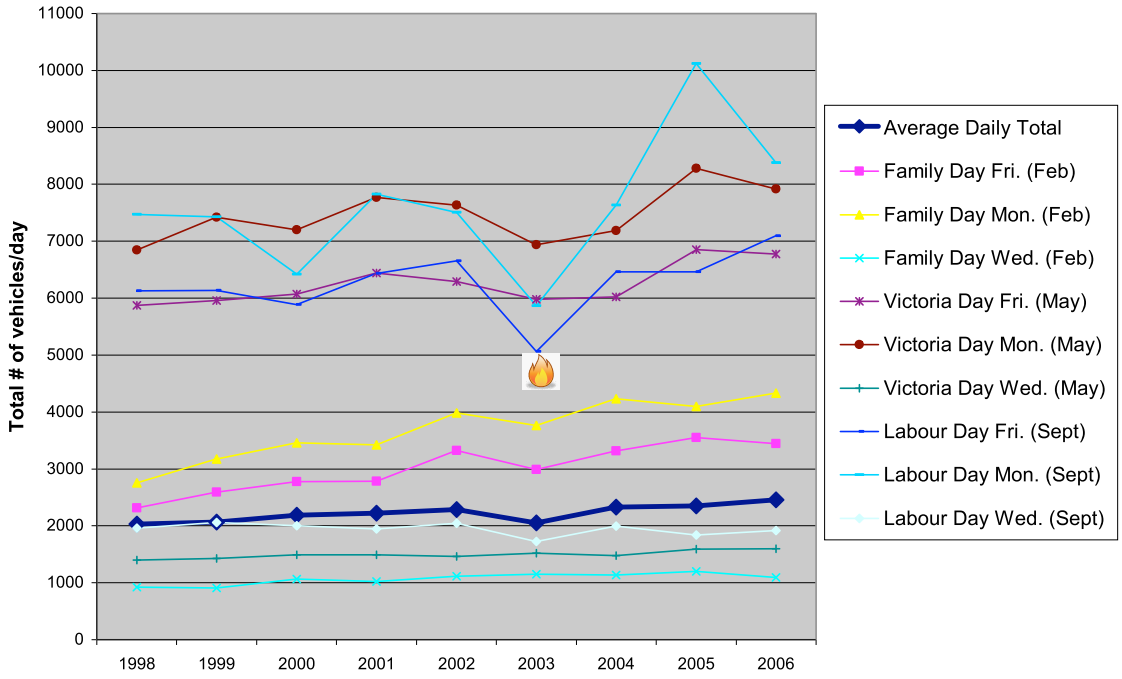
- Alberta Family Day long weekend (February) total increase: 49%
- Victoria Day long weekend (May) total increase: 8%
- Labour Day long weekend (September) total increase: 15%

[14] 2007 was excluded from analysis due to a lack of data points for February, March, and April.

These increases can be compared to a 21% increase in total traffic in the same period of time.

Only Alberta has the Family Day holiday in February. The increase in the Alberta family day long weekend traffic may be logically explained by an increase in the total number of properties in the Upper Columbia Valley owned by Albertans and Calgarians (see Chart 10. Holiday Weekends: Friday, Monday, and Wednesday).

10. Holiday Weekends: Friday, Monday, and Wednesday (1998-2006)

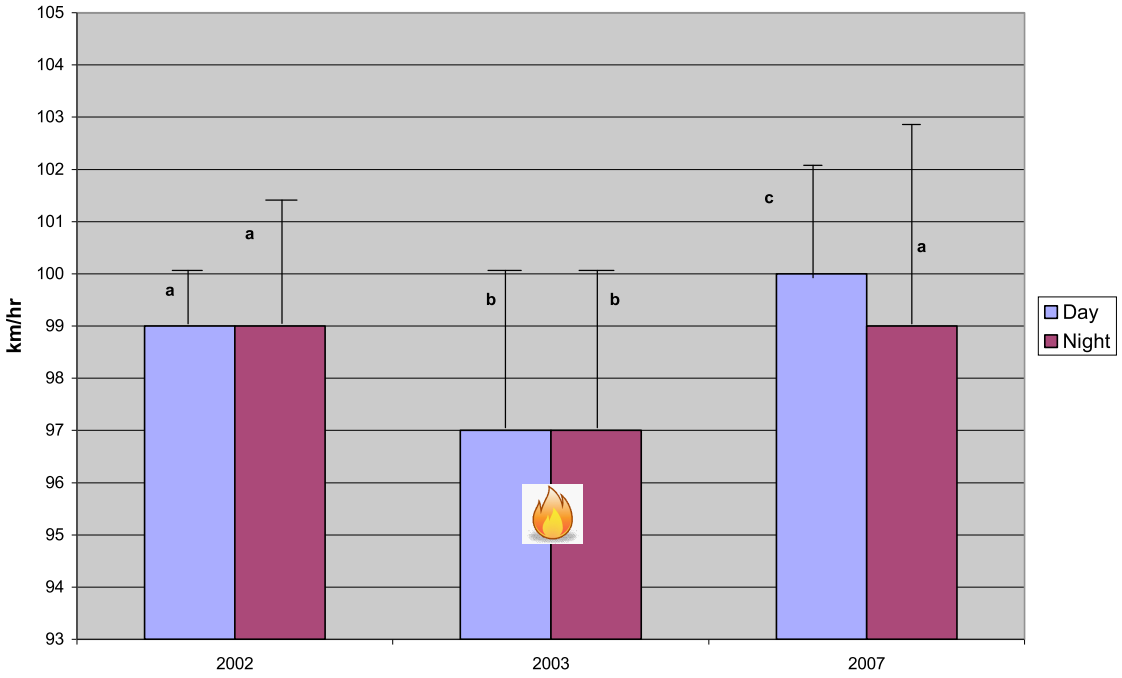


Speed

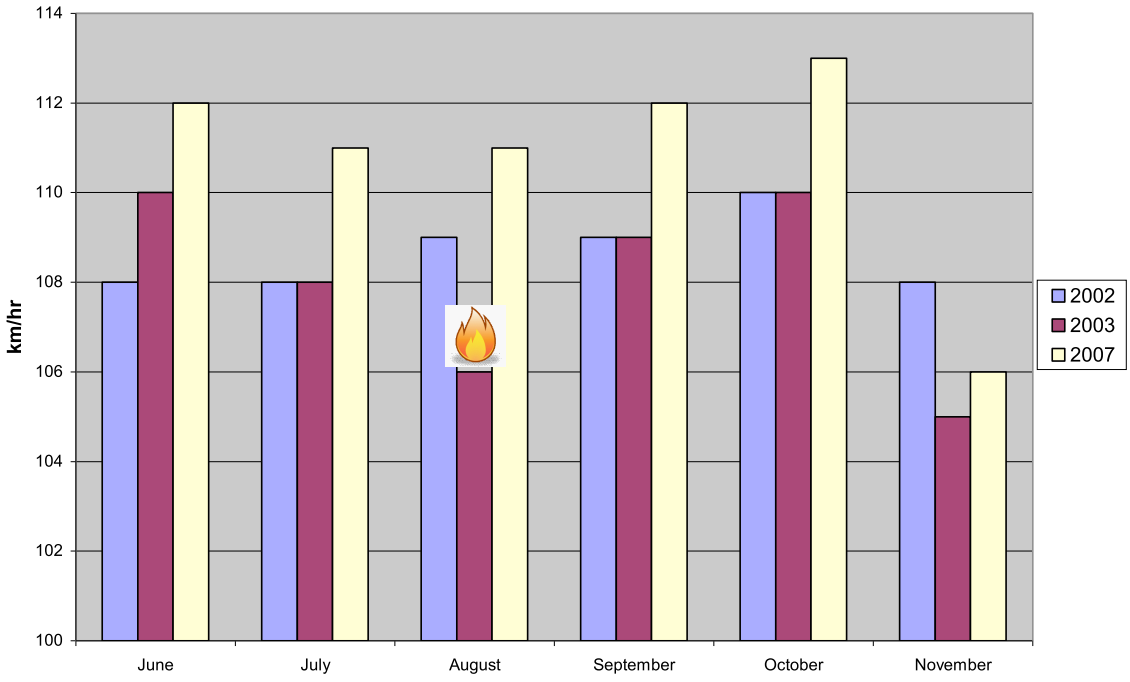
Data was reviewed for 2002, 2003, and 2007. The 2003 data has been charted but is not statistically valid as the august 2003 highway closure skews the data dramatically.

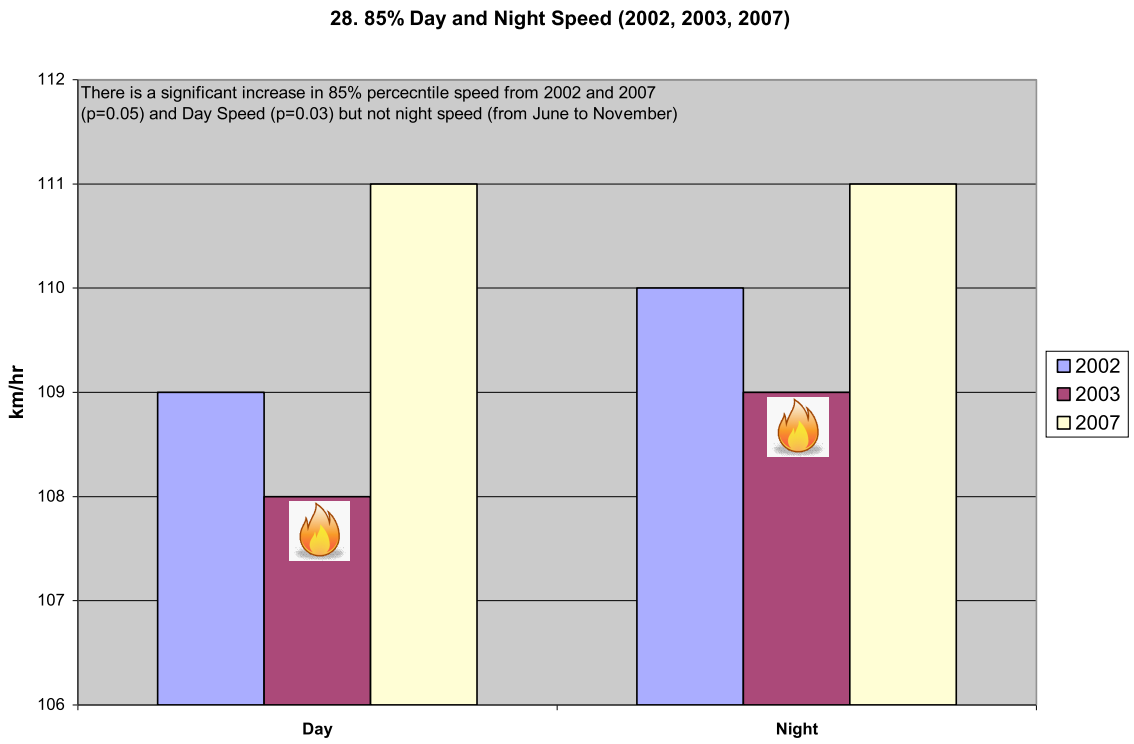
It is difficult to make generalizations based on 3 data points. However, the speed data seems to indicate that there has been a significant increase in both the 85th percentile and average speeds for daytime travel from 2002 -2007, but not for night time travel. Night speeds tend to exceed day speeds with the exception of October and November (see Charts 26, 27, and 28 – Average Day and Night Speeds and 85th percentiles).

26. Average Day and Night Speed (June to November) (2002, 2003, 2007)



27. 85% Speed (2002, 2003, 2007)





Class

The Parks Canada classifier data is incomplete for the purposes of trend analysis. As a result, the data analysis presented below is highly generalized, does not review trends (increase or decrease in volumes, classes etc…) and should be used with caution and caveat. We were able to chart the data from 2002, 2003, and 2007, for the months of June to November.

The classes are Private Vehicle (PV), Recreational Vehicle (RV), Bus, SU Truck, and TTC Truck. Bus and SU Truck data appear to be inaccurately duplicated in the raw data. As such, while the Bus and SU Truck data appear in the graphs, they have not been analyzed for this report (see Charts 20b, 21b,and 22b - % Class for Annual Totals, Day Totals, and Night Totals).

Private Vehicles

Private vehicles remain the primary class of vehicle on the highway, accounting for approximately 84% of total traffic year round. Private vehicles tend to make up a lesser percentage of night time traffic (approximately 78-80%).

RVs

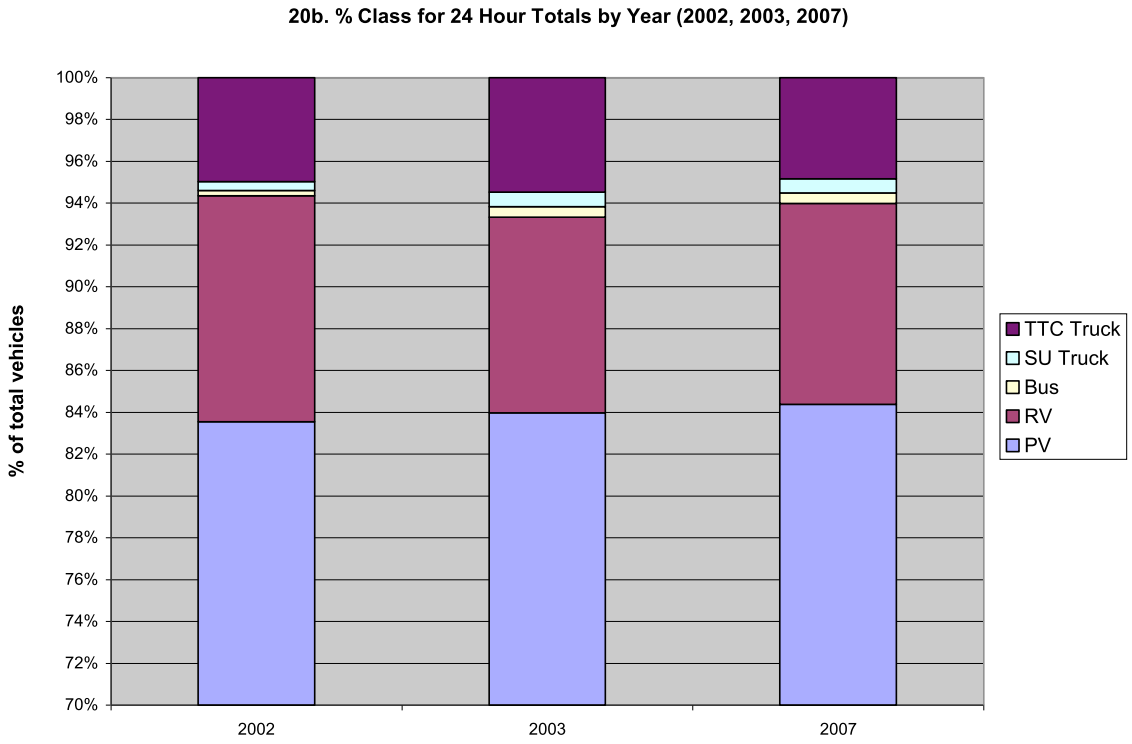
During the months of June-September, Recreational Vehicles make up approximately 10-15% of traffic on the parkway. This figure falls to 2-3% in October and November. RVs make up an average of approximately 6-8% of total traffic from June to November.

TTC Trucks

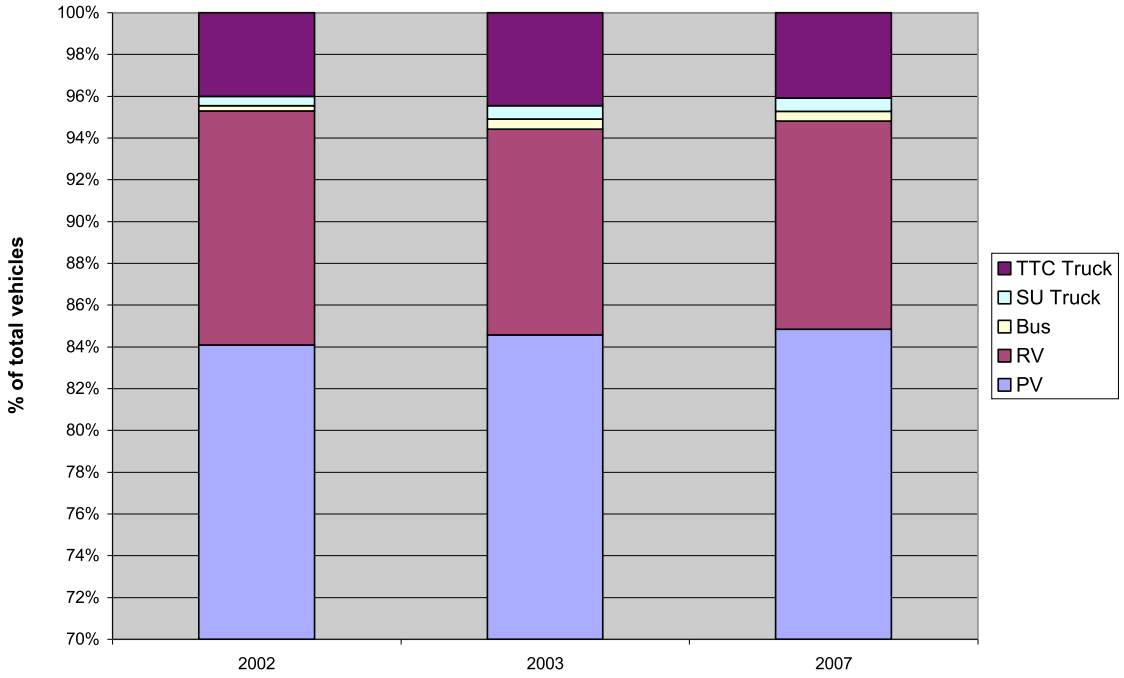
TTC Trucks make up approximately 5% of vehicles on the Parkway. TTC Trucks constitute approximately 4% of day time traffic, and 10-13% of night time traffic.

Day vs. Night

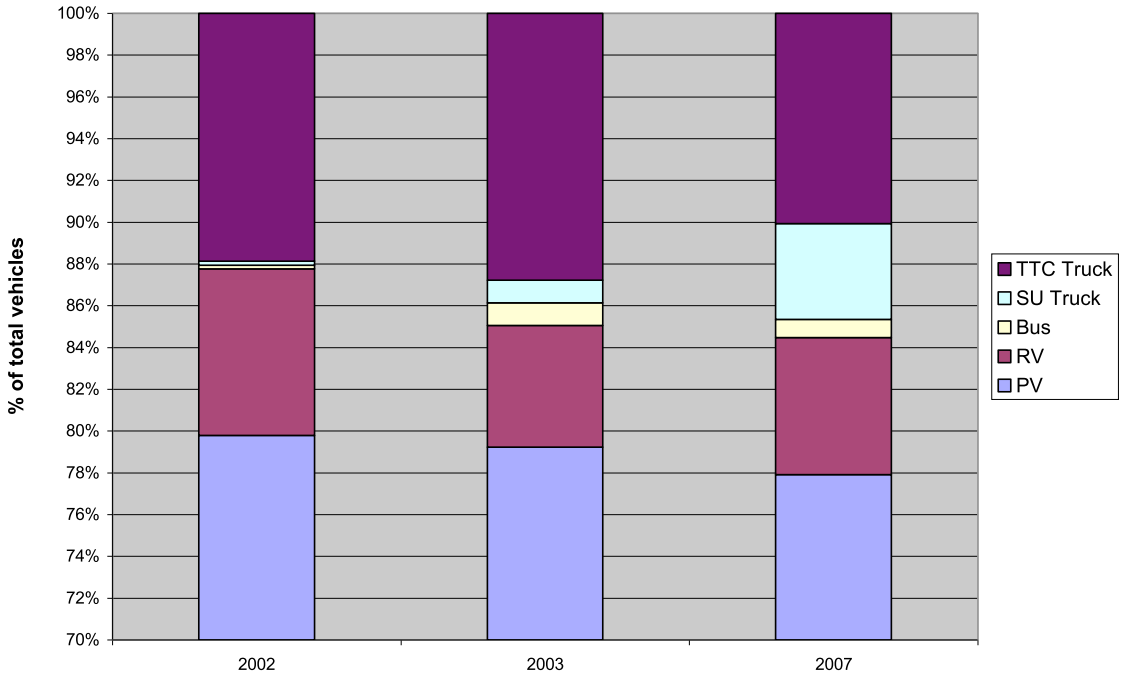
RVs tend to make up a consistent percentage of vehicles on the highway during both day and night time hours for the months of June to September. Private vehicles tend to make up a lesser percentage of vehicles in the nighttime hours, with TTC Trucks making up most of the difference. TTC Trucks constitute approximately 4% of day time traffic, and 10-13% of night time traffic.



21b. % Class for Daytime Totals (2002, 2003, 2007)



22b. % Class for Night Totals (2002, 2003, 2007)



Future use of the Kootenay Parkway

Regression Analysis

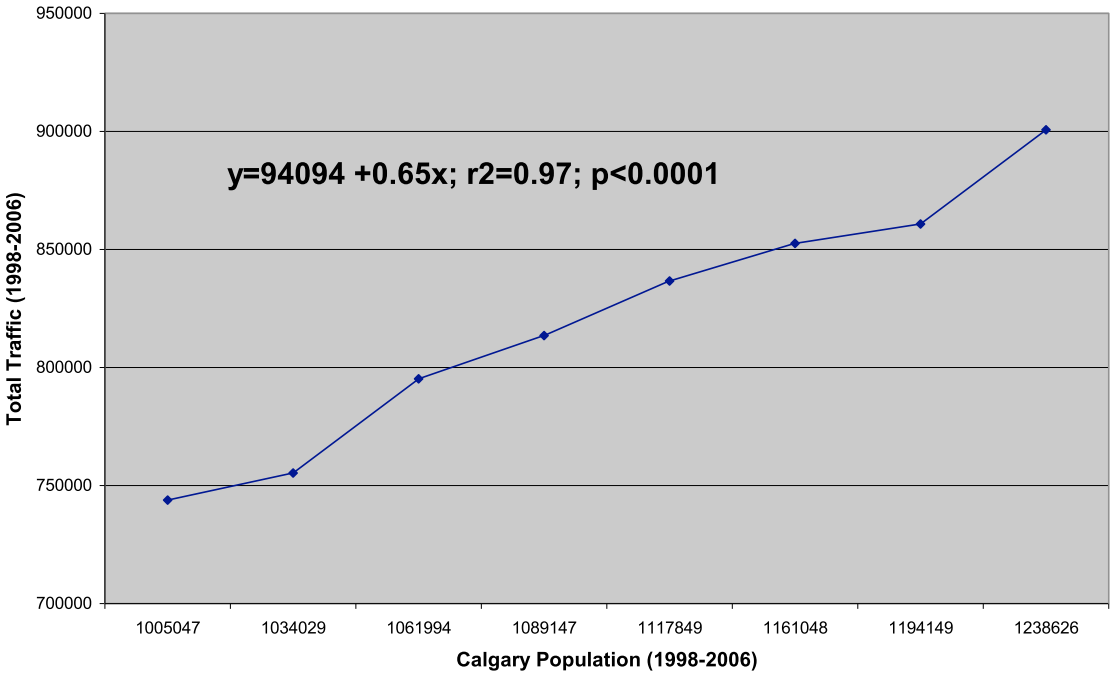
We conducted a regression analysis on three sets of data in relation to the Parks Canada traffic counter data:

- Calgary Region Historical Population Growth;
- Upper Columbia Valley Historical Population Growth; and
- Upper Columbia Valley Development

(see Charts 32, 33, and 34 – Regressions)

It was determined that the historical relationship between increases in the Calgary Region population and traffic on the Kootenay Parkway for the period from 1996-2006 was significant. As such, population projections for the Calgary Region were utilized to project traffic volumes on the Kootenay Parkway.

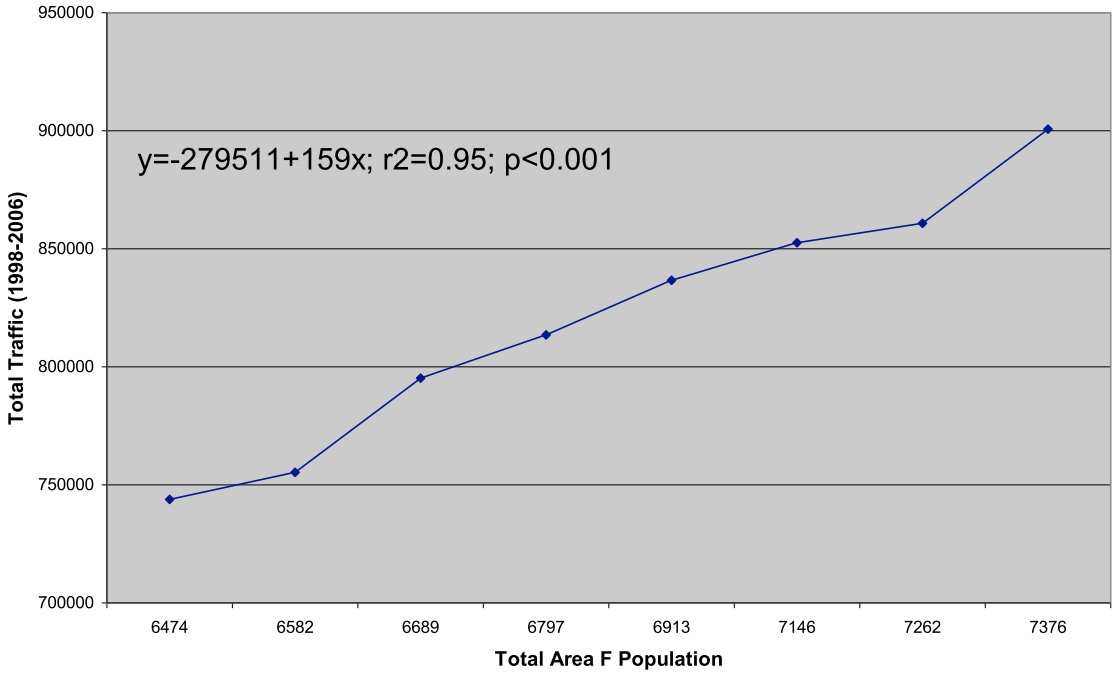
32. Regression: Calgary Region Population and Traffic Volumes



It was determined that the historical relationship between increases in the Upper Columbia Valley population and traffic increases on the Kootenay Parkway for the period from 1996-2006 was significant. However, when we attempted to project future traffic volumes based of population projections of between 1.2 and 1.4%/year (same as projection used for the Calgary Region) the results were invalid, as indicated by a decrease in total traffic in the first year. This result is not unexpected as, over time, population growth in the Upper Columbia Valley has

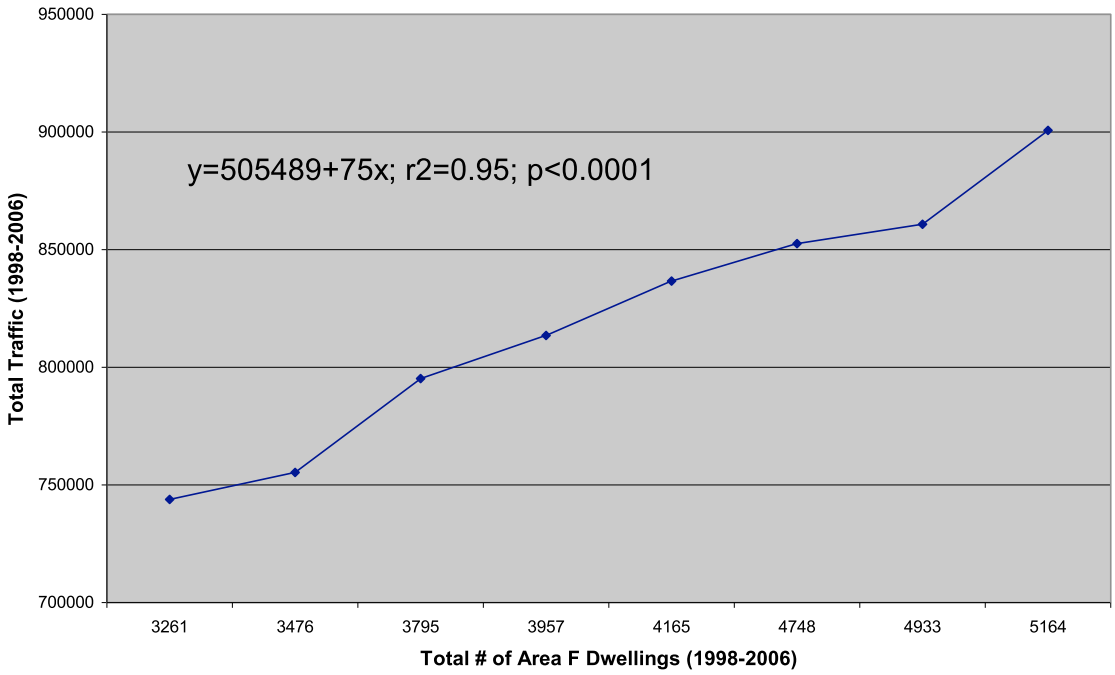
slowed (MacNeil, 2007. p12.) while traffic has continued to increase steadily. For this reason, population projections for the Upper Columbia Valley were not reviewed and were not utilized to project traffic volumes.

33. Regression: Upper Columbia Valley Population and Traffic Volumes



It was determined that the historical relationship between increases in residential development in the Upper Columbia Valley and traffic increases on the Kootenay Parkway for the period from 1996-2006 was significant. As such, development projections for the Upper Columbia Valley were

34. Regression: Upper Columbia Valley Dwelling Units and Trafic Volumes



utilized to project traffic volumes on the Kootenay Parkway.

Traffic Volume Projections

Given statistically significant relationships between Calgary Region population and Upper Columbia Valley residential development and traffic volumes on the Kootenay Parkway, we developed traffic volume projections based on Calgary Region population projections and Upper Columbia Valley residential development projections.

The tables below have data gaps in order to reflect the differences in reporting points between the Calgary population projections and the Upper Columbia Valley development projections. Also, note that the Upper Columbia Valley data includes a second set that incorporates potential resort development.

Table 7. Calgary Population Based Traffic Projections

	2007	2009	2015	2016	2020	2026	2036	2046	2056	2066	2076
Calgary 1.4% pop. Growth/yr	926,665			1,674,372		1,991,447	2,269,373	2,529,650	2,771,004	2,990,085	3,190,537
Calgary 1.3% pop. Growth/yr	926,665			1,653,152		2,025,798	2,183,414	2,410,276	2,617,538	2,803,790	2,974,367
Calgary 1.2% pop. Growth/yr	926,665			1,651,466		1,915,829	2,131,755	2,328,244	2,504,424	2,659,677	2,799,357

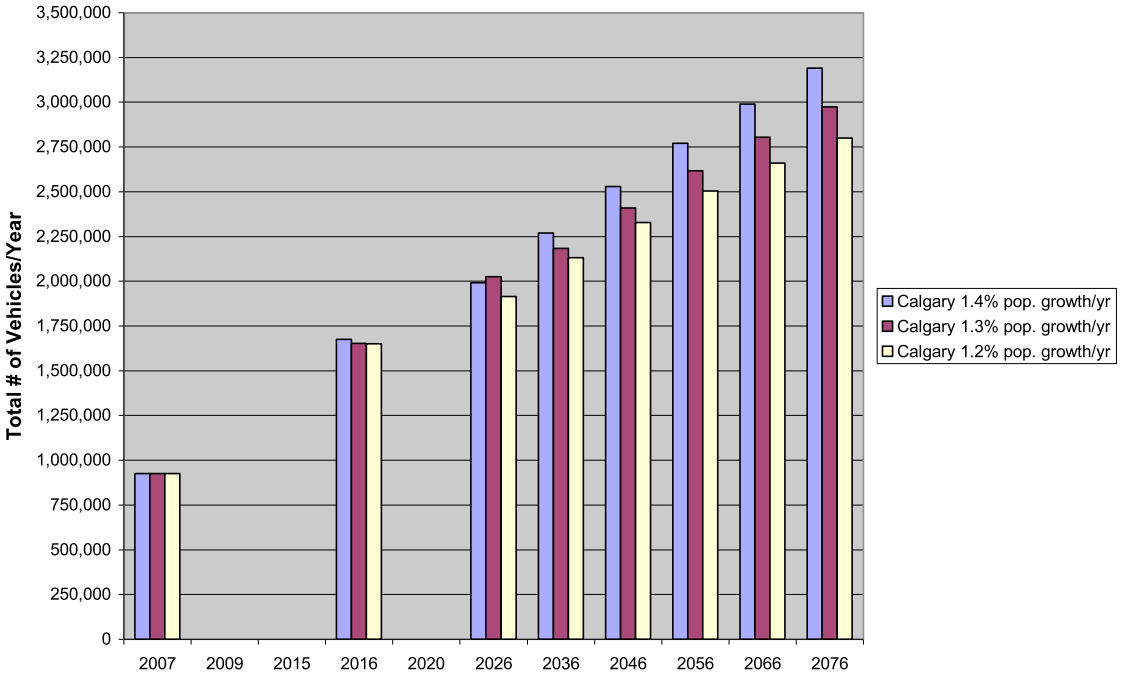
Table 8. UCV Development Based Traffic Projections

	2007	2009	2015	2016	2020
UCV development projections	926,665	1,026,139	1,345,189		1,656,964
UCV incl. resort projections	926,665	1,030,339	1,413,139		2,534,314

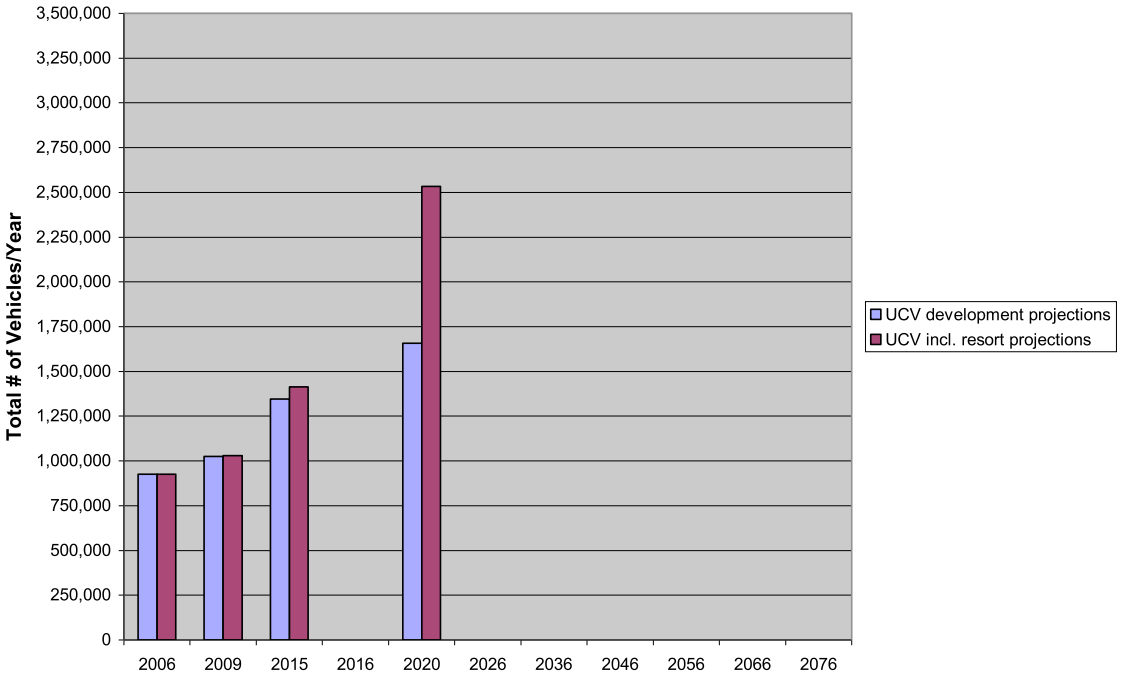
Utilizing the Calgary Region population projections, Traffic on the Parkway can be expected to double to over 1.8 million vehicle trips/year before 2026. By 2076, traffic volumes may reach 2.8-3.2 million vehicle trips/per year (see Chart 29. Traffic Projections Based on Calgary region Population Growth to 2076).

Utilizing the Upper Columbia Valley development projections, by approximately 2020, traffic will reach nearly 1.7 million trips/year. However, if all resort proposals in the Upper Columbia Valley are approved and reach full build-out by 2020-2025, this number could rise to 2.5 million vehicle trips/year (see Chart 30. Traffic Projections to 2020 Based on Upper Columbia Valley Development Projections).

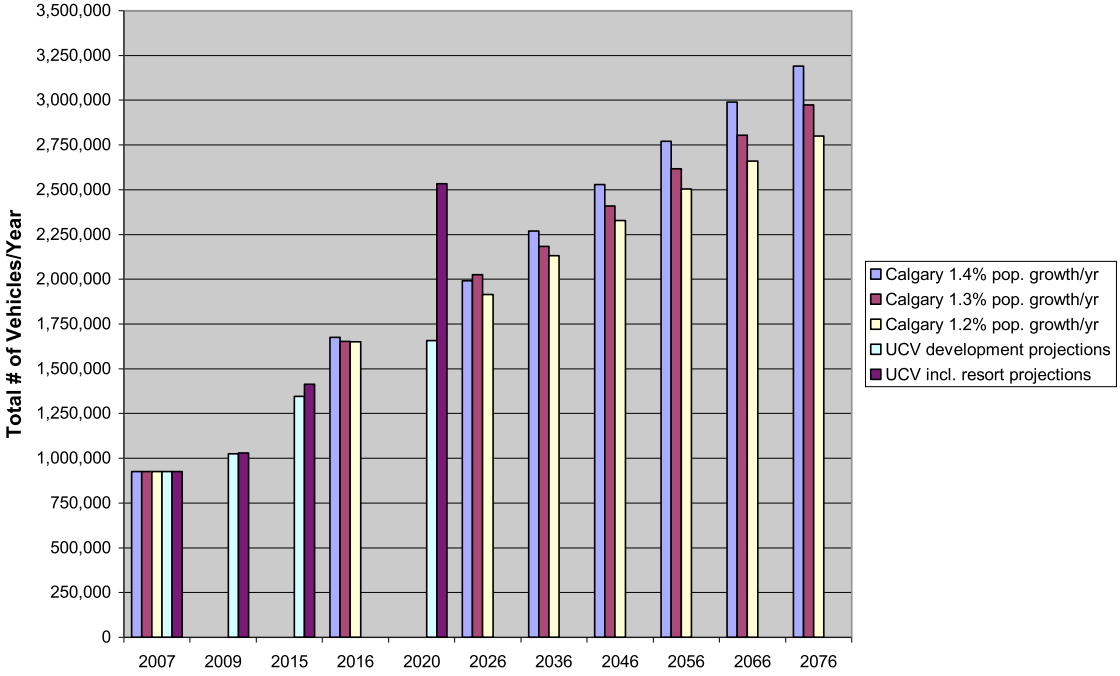
29. Traffic Projections to 2076 Based on Calgary Region Population Projections



30. Traffic Projections to 2020 Based on Upper Columbia Valley Dev't Projections



31. Traffic Projections Based on Calgary Population and UCV Dev't Projections



Section 4
Gap Analysis

In order to more accurately project the future of traffic on the Kootenay Parkway, a number of data gaps will need to be addressed.

Overall, in order to accurately project traffic volumes, more years of historical data will be required. The traffic data utilized in this report spans 1998-2007. However, 2003 data skews the averages. Thus, the increases from 2002-2004 are also invalid. In the absence of more annual data sets it is not a statistically sound approach to "average-out" the 2003 august traffic "dip". Additionally, no counter data is available for February, March and April 2007, thereby rendering 2007 largely invalid for the purposes of trend analysis.

It is critical that a traffic counter and classifier be in place year round for a number of consecutive years. As discussed elsewhere in this report, the classifier data is too patchy to be useful for the purposes of trend analysis. 10-15 years of continuous classifier data would be required in order to accurately assess trends in vehicle type and speed. These frequent and inconsistent data gaps are present in the length and gap data sets as well. Errors in reporting class data for Bus and SU Truck classes will need to be addressed as well.

Vehicle collision data gathered by ICBC appears to be incomplete[15]. In order to determine the effect of increasing traffic volumes on vehicle safety, more accurate data is required. It is likely that many collisions are not recorded by ICBC, but rather by private insurers in Alberta. As such, unless Parks Canada establishes a data collection and sharing relationship with the RCMP, accident data may be impossible to gather accurately.

It would likely be very informative to survey the non-resident property owners of the Upper Columbia Valley. How many trips to the Valley do they make each year? Do they plan to make more or less trips? How long do they stay? Do they plan to retire in the Upper Columbia Valley? This type of information may allow Parks Canada to determine approximately what percentage of total traffic volumes on the Parkway are Calgary Region based, and which portion is attributable to tourist traffic.

Point of tourist origin data can be very difficult to gather. However, there is a significant opportunity in this regard available in the shared Radium Chamber of Commerce and Parks Canada visitor centre. The Chamber could readily collect tourist point of origin and route of arrival data which would assist Parks Canada to understand where non-resident visitors to the region are coming from.

[15] ICBC provided the following accident data summary: "…from 1996-2007 the numbers of collisions were under 10 for each of those years. Unfortunately we cannot release the exact numbers…" (Brakop, 2008.)

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Appendix A

Available Classifier Data Sets

Available classifier data sets for vehicle Class and Speed are inconsistently incomplete across the years. We used the data sets highlighted in Grey below for the purposes of this study. As a result of insufficient data points, no trend analysis was conducted for the class and speed data.

In the table below "c" is for class data, and "s" if for speed data. Months highlighted in Grey were charted.

	2002	2003	2004	2006	2007
Jan		c s	c s		c s
Feb		c s		c s	
Mar		c s		s	
Apr		c s			c s
May		c s			c s
Jun	c s	c s			c s
Jul	c s	c s			c s
Aug	c s	c s			c s
Sep	c s	c s			c s
Oct	c s	c s	c s	**c s**	c s
Nov	c s	c s	c s	**c**	c s
Dec	c s	c s		c	

Appendix B

Parks Canada Traffic Counter and Classifier Data

The following is a listing of appended charts[16].

1. Annual Traffic Totals (1998-2007) (Line Graph)
    a. Annual Traffic Totals (1998-2007) (Bar Graph)
    b. % Change in Annual Traffic (1998-2007)
2. Average Daily Totals by Month (1998-2007) (two-way, southbound, northbound)
3. Average Monthly Totals (1998 – 2007) (two-way, southbound, northbound)
4. Average Daily Totals by Year (1997-2008) (two-way only) (Line Graph)
    a. Average Daily Totals by Year (1997-2008) (two-way only) (Bar Graph)
5. Average Daily Totals: Annual, Summer and Winter (1998-2007).
6. Seasonal Traffic Totals (1998-2007)

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7. Holiday Weekend Friday (1998-2006)
8. Holiday Weekend Monday (1998-2006)
9. Holiday Weekend Wednesday Average(1998-2006)
10. Holiday Weekends: Friday, Monday and Wednesday (1998-2006)

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11. Class: 24 Hour Total by Month (Bar Graph) (2002)
    a. Class: 24 Hour Total by Month (2002) (Stacked Graph)
    b. Class: 24 Hour % by Month (2002)(Stacked Graph)
12. Class: Night Total by Month (Bar Graph) (2002)
    a. Class: Night Total by Month (2002)(Stacked Graph)
    b. Class: Night % by Month (2002) (Stacked Graph)
13. Class: Day Total by Month (Bar Graph) (2002)
    a. Class: Day Total by Month (2002) (Stacked Graph)
    b. Class: Day % by Month (2002) (Stacked Graph)

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14. Class: 24 Hour Total by Month (Bar Graph) (2003)

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[16]  in charts indicates data affected by 2003 highway closures during August and Early September due to wildfire