IMPACT OF CANADIAN ECONOMIC DEVELOPMENT ON NORTHERN MONTANA HIGHWAYS - PHASE II

PORTS OF WILDHORSE AND MORGAN HIGHWAY CORRIDORS

FHWA/MT-14-005/8197-002

Final Report

prepared for
THE STATE OF MONTANA
DEPARTMENT OF TRANSPORTATION

in cooperation with
THE U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

October 2014

prepared by
Stéphane Gros, Jon Lee
Daniel Goodman, Brian Park
Melissa Pumphrey, Tim Erickson
Michael Johnson

HDR
Silver Spring, Maryland

RESEARCH PROGRAMS

MDT

Impact of Canadian Economic Development on Northern Montana Highways- Phase II

Ports of Wild Horse and Morgan Highway Corridors

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Prepared by

HDR
8403 Colesville Road, Suite 910
Silver Spring, MD 20910

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16. Abstract

The purpose of this study is to determine whether highway infrastructure in Montana is adequate to support future expected growth in traffic resulting from economic development in Canada, and a number of potential changes in border operations, industry structure and freight-related policy. Historical data on cross-border traffic, empirical findings from existing research, interviews with selected industry representatives and subject matter experts, as well as professional judgment, were used to: i) provide an overview of the regional economy, highlighting threats and opportunities for future economic development and growth in international trade; ii) develop forecasts of cross-border commodity flows and commercial traffic under alternative scenarios and economic growth assumptions; iii) document existing conditions along two highway corridors connecting US 2 with the Canadian border, namely the S-232 corridor between US 2 and Wild Horse, and the US 191 corridor between US 2 and Morgan; and iv) assess whether existing highway infrastructure along these corridors was adequate to accommodate future expected traffic levels. A number of conclusions could be reached. First, it is anticipated that existing highway infrastructure in Montana will be adequate to handle the potential increase in overall traffic, as well as the potential increase of truck traffic for both corridors of interest. Second, should the existing pavement and geometric conditions be maintained, the expected increase in AADT and truck percentages should not degrade the weighted traffic operations below free-flow conditions (LOS A); although individual locations within the corridor may experience higher degradation in operations than the overall weighted average operations. Third, traffic operations along the highway segments immediately adjacent to the ports are expected to remain below free-flow conditions through 2032. Only under the most aggressive growth scenario would traffic conditions south of Wild Horse deteriorate below LOS A in the busiest hour, in 2028.

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- Becky Duke – MDT, Planning
- Hal Fossum – MDT, Planning (formerly)
- Zia Kazimi – MDT, Planning (formerly)
- Matt Ladenburg – MDT, Maintenance
- Doug McBroom – MDT, Planning
- Christopher Dorrington – MDT, Planning
- Dan Moore – MDT, Motor Carrier Services
- Wayne Noem – MDT, Planning
- Jim Skinner – MDT, Planning

The study was managed by Kris Christensen, Research Programs Manager, Christopher Dorrington and Doug McBroom, Chairs of the Technical Panel.

The consultant team conducted multiple interviews with economic development officials, business owners, local and state elected officials, and other stakeholders. Due to the informal nature of some of these communications (e.g., telephone conversations, e-mail exchanges, chance encounters at presentations, etc.), it is not possible to acknowledge all those who gave their insights and offered assistance over the course of the project.

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EXECUTIVE SUMMARY

This study is Phase 2 of a broader study initiated in 2009 on the Impacts of Increased Canadian Economic Development (ICED) on Northern Montana Highways. The findings of Phase 1 are summarized in a final report dated March 2010 and available through the Montana Department of Transportation (MDT), at http://www.mdt.mt.gov/research/projects/mcs/canada_impact_nhwy.shtml (last accessed October 3, 2014)[1].

The 2010 ICED Study

The primary purpose of Phase 1 was to evaluate current and future Canadian economic activity and the impacts of associated commercial traffic[2] on Montana highways and US – Canada border crossings.

The ports and highways under consideration stretched from the Port of Sweet Grass, at the Western end of the study area, to the Port of Raymond (Figure ES-1); and the study assessed the impact of Canadian economic development on all north-south connecting highway corridors, which include Interstate 15; US Highways 2 and 191; Montana Highways 13, 16, and 24; and Secondary Highways 232, 233, 241, and 511.

As stated in the March 2010 final report, while the traffic forecasts developed in Phase 1 did not suggest significant capacity constraint at any of the ports or connecting highways through 2030, the results were not "conclusive." This was due, mostly, to the high level of uncertainty surrounding the forecasts, in particular with respect to the business cycle, trade agreements, environmental and energy policies, and private sector supply-chain decisions.

The report concluded with two specific areas for more detailed planning: i) expanded port operations within the study area, to support regional connectivity and economic opportunities; and ii) tracking of potential highway corridor capacity needs, in particular in light of expected development in the energy sector. It also established that Secondary Highway 232 (connecting US 2 to the port at Wild Horse) and US Highway 191 (connecting US 2 to the port at Morgan) would witness the fastest traffic growth over the forecast period.

[1] In this document, Phase 1 of the study is referred to as the ICED 1 Study or the 2010 ICED Study. The final report prepared in Phase 1 is cited as MDT (2010).

[2] Commercial traffic includes trucks and commercial auto traffic (on-the-clock business travel and trips by visitors for tourism, recreation or shopping purposes; family visits and commuting trips are not included in commercial auto traffic).

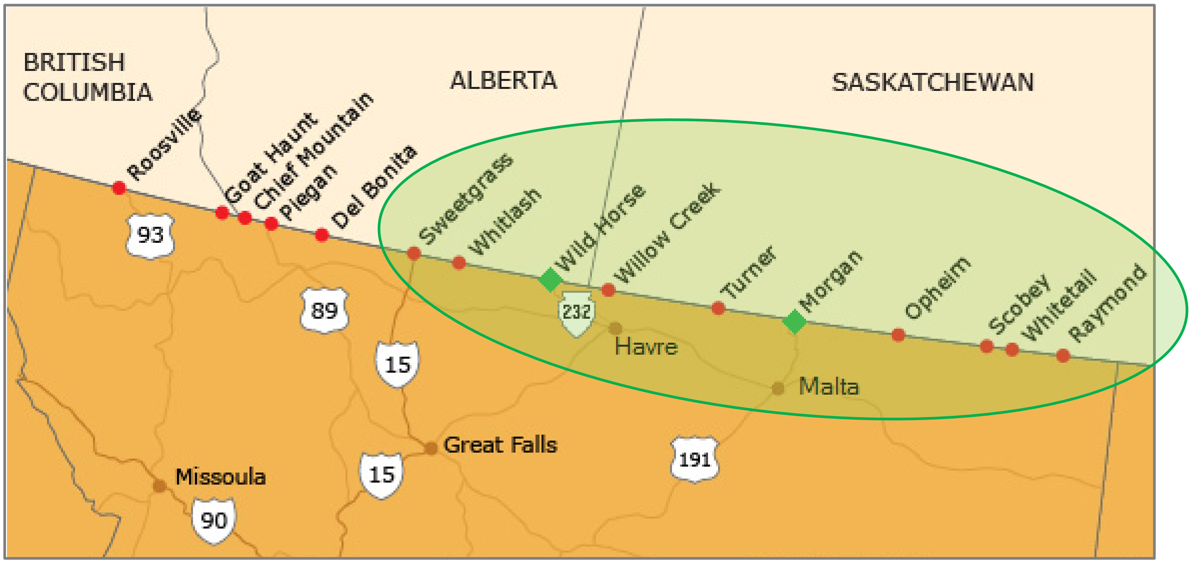

Figure ES-1: Overview of Phase 1 Study Area

Source: Adapted from TBWG (2013)

Objectives of Phase 2

The primary objective of Phase 2 is to determine whether highway infrastructure in Montana is capable of supporting additional traffic resulting from 16-hour 7-days-a-week ports at Wild Horse and Morgan.

Secondary objectives include the production of traffic forecasts along the S-232 and US 191 corridors, while considering the impacts of: Canadian economic development (in particular from energy investments in Alberta and Saskatchewan); planned infrastructure improvements; restructuring of the Canadian wheat industry; and the potential harmonization of Truck Size and Weight (TS&W) regulations.

Research Findings

This study uses a combination of desktop research, telephone interviews, economic modeling, and professional judgment to produce findings and conclusions in five main areas: i) regional economic and trade outlook; ii) existing conditions in the S-232 and US 191 corridors; iii) impacts of various operational and policy changes; iv) cross-border trade and commercial traffic forecasts; and v) adequacy of highway infrastructure in the corridors of interest.

Regional Economic & Trade Outlook

The region, overall, was better able to weather the effects of the Great Recession than other states and provinces. GDP growth in Alberta and Saskatchewan was particularly strong in recent years as a result of rapid expansions in the oil and gas industry and in the construction sector. Growth in Montana was more subdued, but the state generally fared better than the rest of the Nation, in particular in terms of income growth and employment.

The Mining and Oil and Gas sector has been the primary driver of economic growth in Alberta and Saskatchewan. Despite some uncertainty in relation to oil prices and pipeline capacity, growth in Alberta's oil sands is expected to continue at a solid rate. Growth prospects in oil production, potash production, and uranium mining in Saskatchewan are also strong. Development of the Bakken formation has generated rapid employment growth in Eastern Montana (in Richland County, in particular), but investors' interest has – so far – remained focused on thicker sections of the formation in North Dakota. In Agriculture, farmers have benefited from relatively high crop prices (by historical standards), but forestry in Montana has yet to recover from the reduction in lumber demand associated with the 2008 housing bust. Employment growth in the sector is expected to remain low, but steady. Strong growth is expected in the Construction sector across the region, as a result of energy development and associated infrastructure needs. Increased migration into the two Canadian provinces is also expected to stimulate the demand for, and construction of, residential units. Growth in manufacturing employment is expected to be relatively moderate in Alberta and Saskatchewan. A return to healthier growth is expected in Montana partly as a result of energy development in the East; but also through an anticipated "re-shoring" of overseas manufacturing jobs. Growth in tourism is expected to remain low and steady; but is facing a mix of challenges (e.g., effects of climate change on the demand for outdoor activities such as skiing and water rafting; volatile fuel prices) and opportunities (e.g., increases in income and leisure time; strengthening of the Canadian dollars making international travel cheaper to Canadians).

U.S. imports from Canada through Montana POEs have decreased in value and volume since their pre-recession peak of 2008 (Figure ES-2). Growth resumed after 2009, but total import value was about 30 percent lower in 2012 than four years earlier; imports were about 14 percent lower in tonnage.

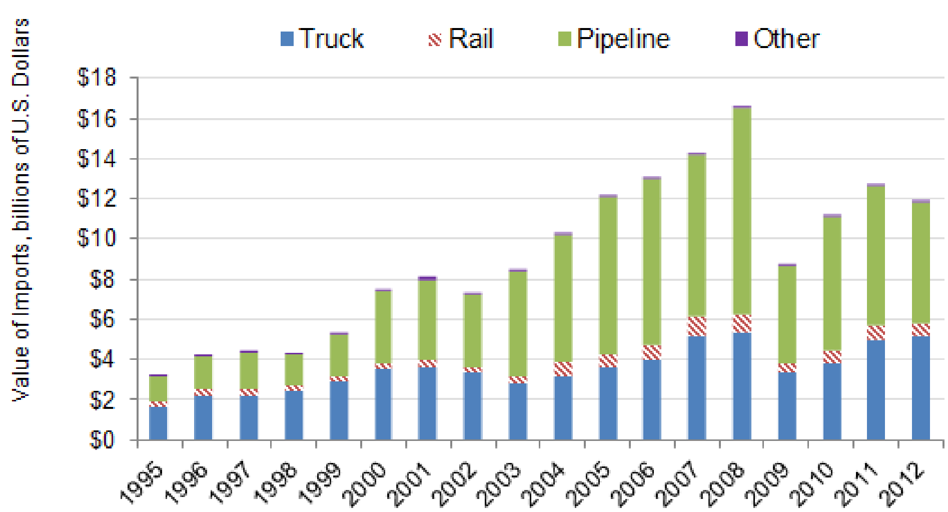

Figure ES-2: Value of Imports from Canada through Montana POEs by Mode, 1995 – 2012

Source: BTS (2013)

After a sharp decline in 2009, exports to Canada increased steadily in 2010 and 2011, and exceeded their pre-recession peak by over $2.0 billion in 2012 (Figure ES-3).

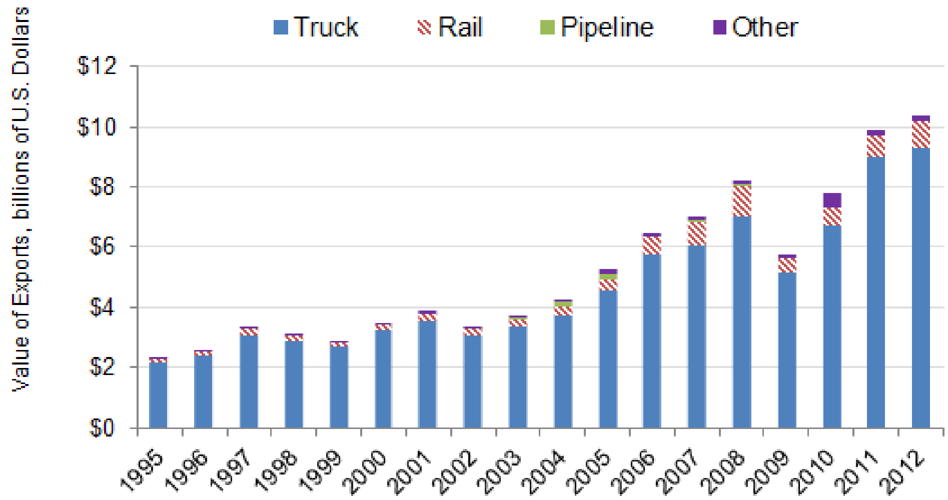

Figure ES-3: Value of Exports to Canada through Montana POEs by Mode, 1995 – 2012

Source: BTS (2013)

The distribution of total trade (imports plus exports) through Montana's border with Canada remained extremely skewed towards a few commercial ports. The Port of Sweet Grass / Coutts, in particular, accounted for about 80 percent of total trade value in 2012[3].

Existing Infrastructure Conditions & Operations in the S-232 Corridor

The S-232 corridor is located within Hill County, in Northern Montana. It connects US 2 in Havre, MT to the Port of Wild Horse. It is about 44 miles long (Figure ES-4).

S-232 is a Rural Major Collector with two lanes (one lane in each direction), an average pavement width of 25.4 feet, and limited or no shoulders. Pavement conditions are generally good, and the facility currently operates at LOS A (with average vehicle speeds at – or close to – posted speed limits).

On the Canadian side, S-232 continues as Alberta Provincial Highway 41, with a connection to Highway 1 (i.e., Trans-Canada Highway) near Medicine Hat, about 90 miles to the north. Highway 41 is an Arterial with two lanes (one lane in each direction) and limited or no shoulders.

[3] Available trade statistics may not accurately represent the true location of trade flows due to filing procedures.

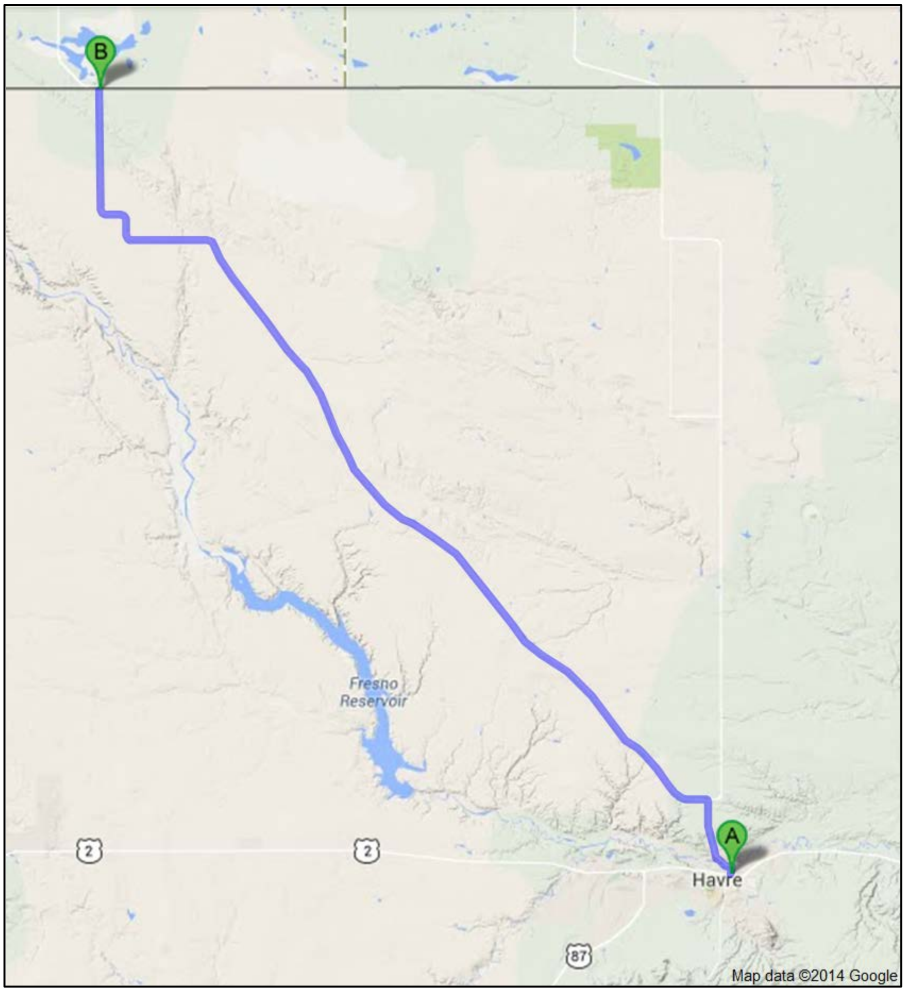

Figure ES-4: Map of the S-232 Corridor

Source: Google (2014a)

Wild Horse is a two-lane permit port[4] open from 8 a.m. to 9 p.m. during summer time[5], and between 8 a.m. and 5 p.m. during the rest of the year. In 2012, the port was the third largest border crossing within the study area, in terms of AADT. With an average of 160 vehicles per day (total northbound and southbound), it was well behind Sweet Grass (1,790 vehicles a day with three southbound inspection lanes for passenger vehicles and two lanes for trucks) and Raymond (290 vehicles, with three southbound inspection lanes). Overall, the port accounted for about 2.2 percent of all southbound crossings between Canada and Montana (BTS 2013), and 2.9 percent of all northbound crossings (Statistics Canada 2013).

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[4] Permit ports do not have the infrastructure to off-load cargo for physical examinations. Commercial shipments that require a formal entry must be pre-approved or permitted by the Area Port Director to be allowed to enter through the port.

[5] Between May 15 and September 30 in the U.S., and between April 29 and October 31 in Canada

Data on wait times at the Port of Wild Horse are not available. Delays are expected to be minimal given the low traffic volumes in relation to Sweet Grass, which has three additional inspection lanes handling more than ten times as much inbound traffic, or Raymond, which has one additional inspection lane with double the amount of inbound traffic.

On a weighted average basis, AADT in the corridor grew at an average annual rate of 0.3 percent between 1998 and 2012, but declined in 2012 (Figure ES-5).

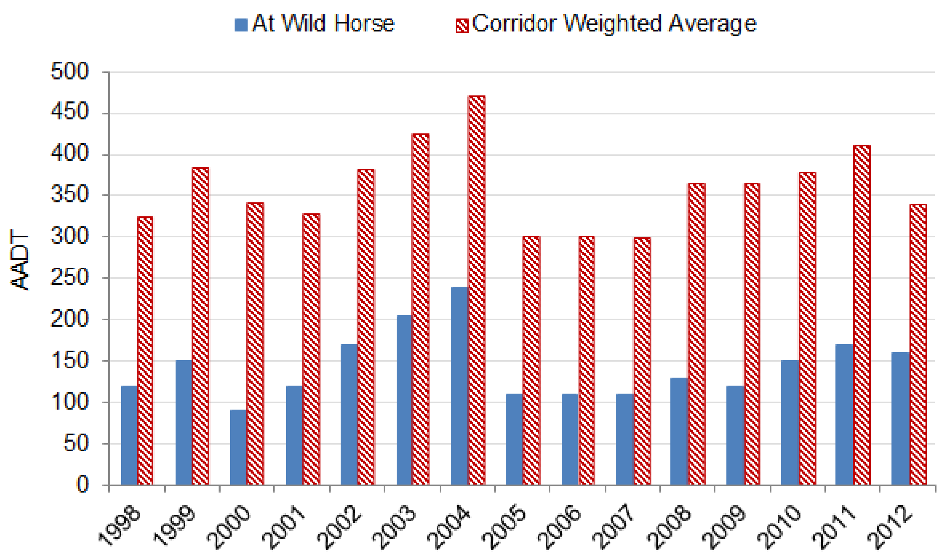

Figure ES-5: Historical AADT in the S-232 Corridor, 1998 – 2012

Source: MDT (2013a)

Traffic in the corridor is fairly balanced between the southbound and northbound directions, but the share of southbound traffic declined in recent years. In 2012, only 48 percent of total traffic at the Wild Horse POE was southbound, compared to 63 to 65 percent between 1998 and 2005.

A total of 69 crashes occurred within the S-232 corridor between 2003 and 2012, including two fatal accidents. Nearly 40 percent of all accidents were rollovers; the both fatalities and all incapacitating injuries were the result of rollovers. Most accidents occurred in the southern end of the corridor, including both fatal accidents. The data do not suggest any deterioration in safety performance along the corridor over time.

Existing Infrastructure Conditions & Operations in the US 191 Corridor

The US 191 corridor is located within Phillips County, in Northern Montana. It connects US 2 in Malta, MT to the Port of Morgan, for a total length of about 54 miles (Figure ES-6).

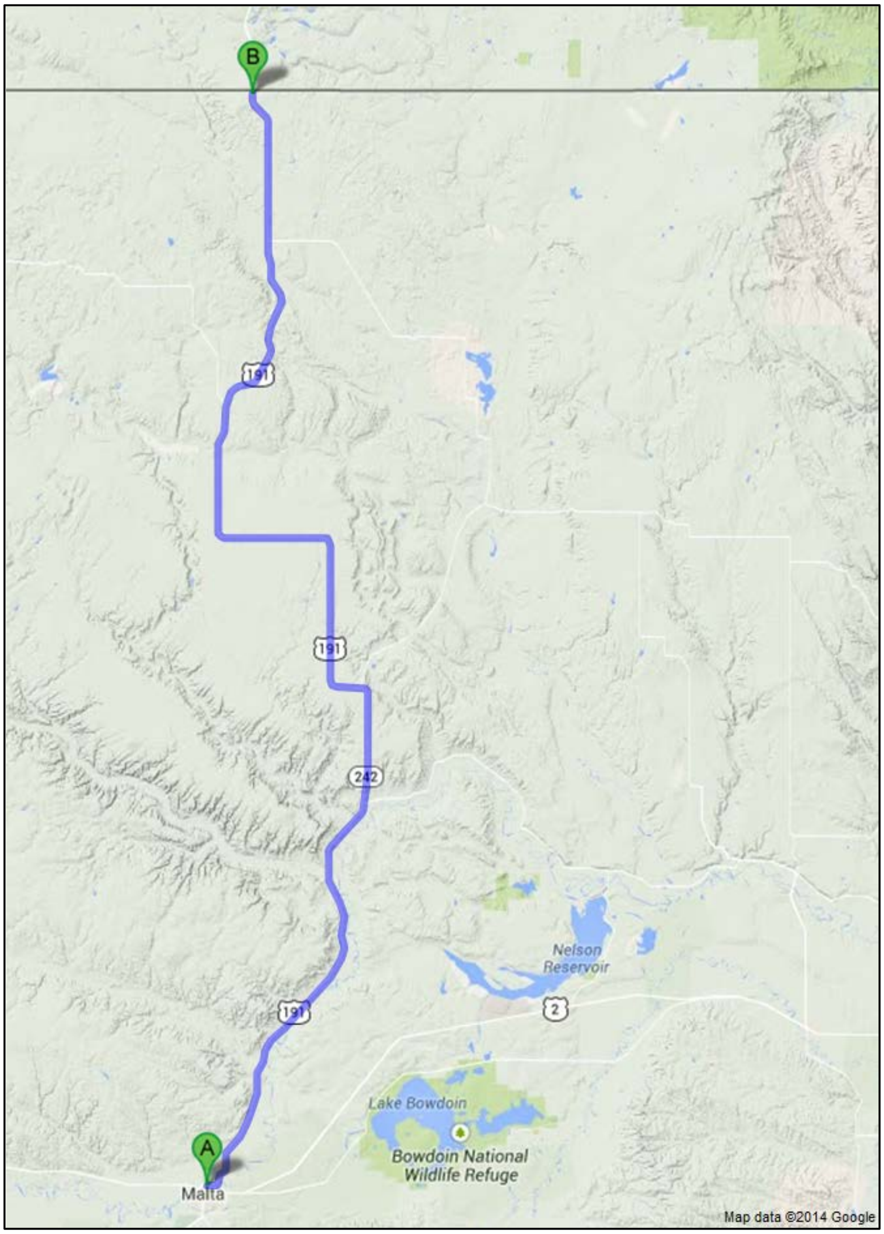

Figure ES-6: Map of the US 191 Corridor

Source: Google (2014b)

US 191 is a Rural Principal Arterial, with two lanes (one lane in each direction), an average pavement width of 28.8 feet, and two- to three-foot shoulders. Pavement conditions are generally good, and the facility currently operates at LOS A.

Across the border, in Saskatchewan, US 191 continues as Secondary Highway 4, an Arterial (Class 2), with one lane in each direction and two to three-foot shoulders. Highway 4 connects to Trans-Canada Highway in Swift Current, about 95 miles north of Morgan. The Port of Morgan is a permit port that operates between the hours of 8 a.m. and 9 p.m. from June 1st through September 15 and between 9 a.m. and 6 p.m. the rest of the year. On the Canadian side, southbound, the Port of Monchy is open between 8 a.m. and 9 p.m. from June 1st through September 15, with more limited hours during the remainder of the year[6].

In 2012, the Port of Morgan was the fifth largest border crossing within the study area, in terms of AADT. With an average of 70 vehicles per day, it came behind Sweet Grass, Raymond, Wild Horse, and Turner. The port accounted for about one percent of all southbound crossings between Canada and Montana (BTS 2013), and about one percent of all northbound crossings (Statistics Canada 2013).

Data on wait times at the Port of Morgan are not available, but delays are expected to be minimal given the low traffic volumes compared to Sweet Grass or Raymond.

On a weighted average basis, between 1998 and 2012, corridor AADT fell at an average annual rate of 1.2 percent between 1998 and 2012, and 2.4 percent between 2008 and 2012. Traffic at the port itself, however, grew at an annualized rate of 8.8 percent, from 50 in 2008 to 70 vehicles in 2012 (Figure ES-7).

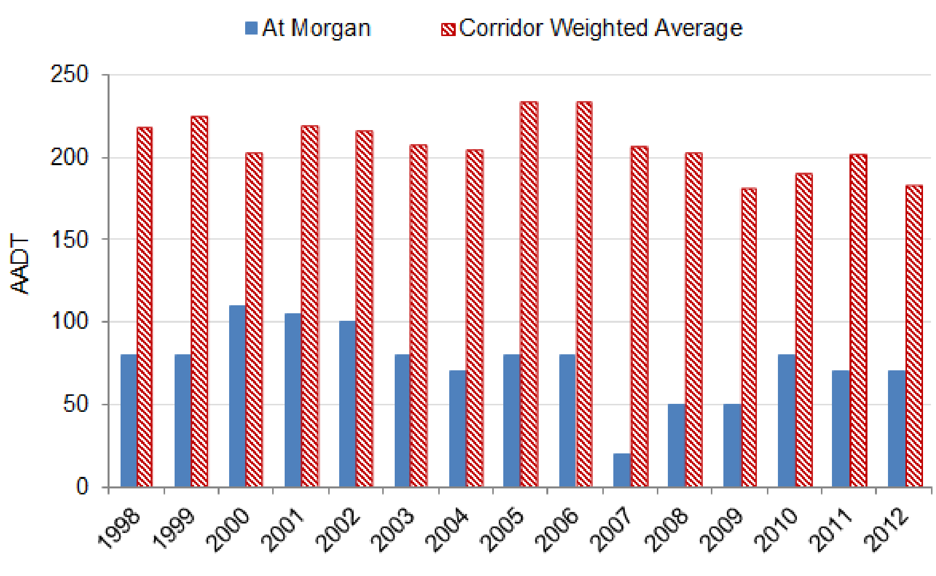

Figure ES-7: Historical AADT in the US 91 Corridor, 1998 – 2012

Source: MDT (2013a)

[6] 9 a.m. to 6 p.m. from the second Sunday in March to May 31 and from September 16 to the first Saturday in November; and 10 a.m. to 7 p.m. from the first Sunday in November to the second Saturday in March.

The distribution of total traffic between the southbound and northbound directions is fairly balanced. As in the S-232 corridor, the share of southbound traffic declined in recent years. Thus, in 2012, exactly 50 percent of total traffic at Morgan was southbound, against 55 to 61 percent during the period from 1998 to 2005.

A total of 45 crashes occurred in the US 191 corridor between 2003 and 2012, including three fatal accidents. As in the S-232 corridor, nearly 40 percent of all accidents were rollovers; all fatalities and incapacitating injuries were caused by rollovers. The majority of accidents occurred in the southern half of the corridor, where traffic volumes are generally higher. No deterioration in safety performance is apparent in the available data.

Impacts of Operational & Policy Changes

The impacts of four operational and policy changes were examined in this study: a) extension of service hours at Wild Horse and Morgan; b) restructuring of the Canadian wheat industry; c) harmonization of truck size and weight regulations; and d) planned infrastructure improvements. Each of these changes is discussed in a separate section below.

Extension of Service Hours

Extension of service hours to 16-hours, 7-days-a-week, at the ports of Wild Horse and Morgan is expected to generate moderate changes in traffic at these ports. The assumption that the ports would still be operated as permit ports limits the potential for diversion from other ports, in particular relative to some estimates reported in the literature. The evidence for growth in passenger vehicles is generally weaker, and the expected traffic impacts smaller. The estimates of impacts developed for this study are summarized in Table ES-1.

Table ES-1: Impacts of Extended Service Hours at the Wild Horse and Morgan Ports of Entry

	Relative to 2012 Volumes			Number of Additional Vehicles		
	Most Likely	Low	High	Most Likely	Low	High
Extended Service Hours at Wild Horse						
Change in Daily Truck Traffic	+30%	+10%	+60%	+6	+2	+13
Change in Daily Auto Traffic	+10%	+5%	+30%	+14	+7	+42
Extended Service Hours at Morgan						
Change in Daily Truck Traffic	+30%	+10%	+60%	+5	+2	+10
Change in Daily Auto Traffic	+10%	+5%	+30%	+5	+3	+16

Notes: Estimates of daily vehicles are rounded to the nearest integer value
Source: HDR Assumptions, based on CBP survey results and evidence presented in literature

Restructuring of Canadian Wheat Industry

The Canadian wheat and barley markets have recently become more competitive with the dissolution of the Canadian Wheat Board (CWB). For over 75 years, grain farmers in Alberta, Saskatchewan, Manitoba, and parts of British Columbia were required to sell all output to the CWB. The CWB lost its monopsony[7] power in August 2012 and now operates as a marketing organization. The effects of CWB reforms on cross-border flows and local traffic in Northern Montana could not be determined with accuracy, but are expected to be small.

This study assumes, tentatively, a range of -10 percent to +10 percent applicable to all commercial traffic originating in the Agriculture sector.

Harmonization of Truck Size & Weight Regulations

As noted in a 1995 report by U.S. DOT, there are a myriad of different size and weight regulations governing trucking across the western border with Canada. In addition to vehicle length and gross vehicle weight requirements, different limits and regulations apply to vehicle height, number of axles and axle spacing, tractor wheelbase length, tire load, axle weight, and steering axle weight. These regulations have led to the use of many different truck configurations along and across the border; with some specifications unique to the region. The need for harmonization has been recognized for many years, but progress has been slow.

Existing research on the issue suggests that harmonizing truck size and weight regulations to Canadian standards would reduce the total number of trucks on Montana's highways by 3 to 20 percent[8].

The composition of the fleet would also change, with increases in the relative share of heavier trucks. This change would affect bridges and pavements in Montana, with accelerated deterioration of bridge structure, potential bridge deficiencies, and reduction in the life of existing pavements.

Planned Infrastructure Improvements

Highway infrastructure investments planned in the S-232 and US 191 corridors were reviewed as part of this study. They are limited in scope and would not have a measurable impact on future traffic volumes. Other infrastructure projects (e.g., proposed pipeline developments) were considered indirectly, in the projections of sectoral Gross Domestic Product used in the traffic forecasting model.

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[7] In economic theory, a monopsony is a market condition in which there is only one buyer.

[8] HDR assumptions, based on evidence presented in the literature, including Stephens et al. (1996), U.S. DOT (2004), and U.S. DOT (1995)

Forecasts of Commercial Traffic

Risk-adjusted forecasts of daily truck traffic at all ports within the study area (that is, at all the ports highlighted in Figure ES-1, between and including Sweet Grass and Raymond) are shown in Figure ES-8. The figure includes historical data up to 2012, along with four different forecasts: Most Likely, 10th Percentile, 90th Percentile, and Historical Trend, developed on the basis of historical traffic growth. It does not reflect any operational or policy changes.

Overall, daily truck traffic at all POEs within the study area is expected to grow at an average annual rate of 1.4 percent between 2012 and 2032, to reach 1,310 vehicles daily at the end of the period (most likely forecast). Daily truck traffic could grow at a higher rate of 3.7 percent per year with a 10 percent probability to reach 2,060 vehicles a day in 2032.

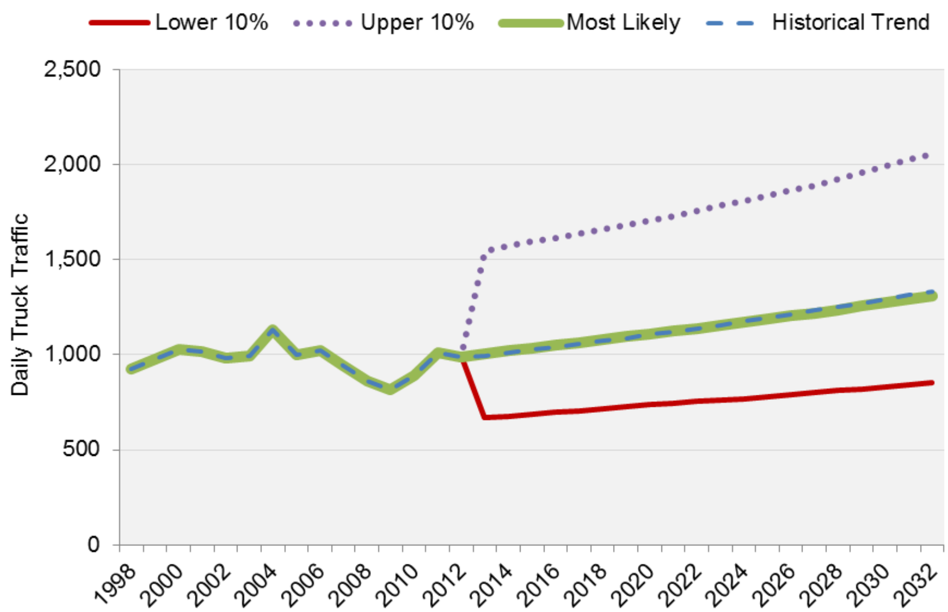

Figure ES-8: Risk-Adjusted Forecast of Daily Truck Traffic within the Study Area

Source: HDR Analysis

Risk-adjusted forecasts of commercial auto traffic at all ports within the study area are summarized in Figure ES-9. Traffic is expected to grow at an average annual rate of 1.9 percent (most likely forecast), and within an 80 percent prediction interval bounded by 870 and 2,030 vehicles a day in 2032.

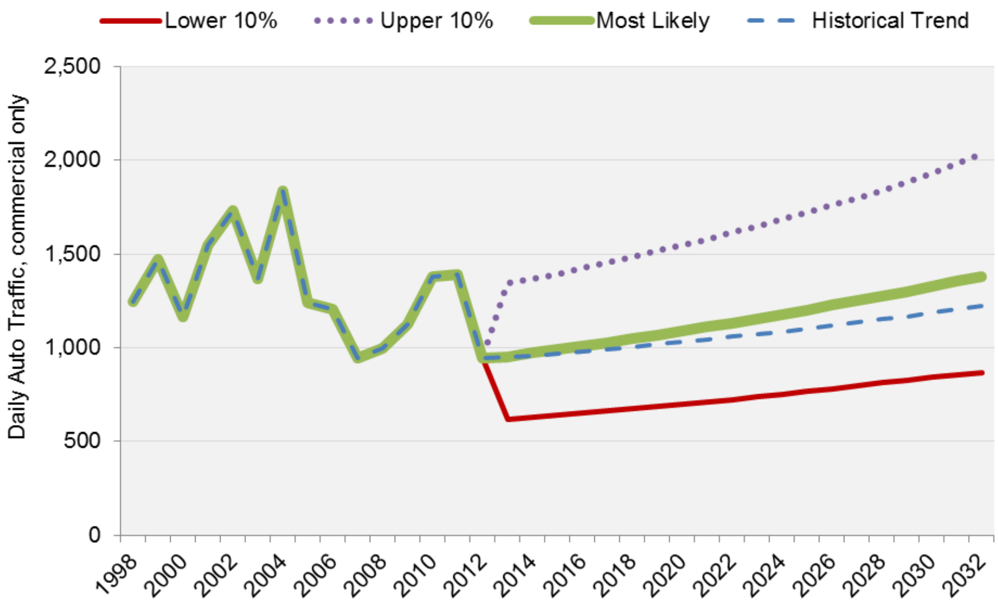

Figure ES-9: Risk-Adjusted Forecast of Daily Commercial Auto Traffic within the Study Area

Source: HDR Analysis

Adequacy of Highway Infrastructure in the S-232 Corridor

Twenty-year traffic forecasts for the S-232 corridor are summarized in Table ES-2.

Table ES-2: Summary of Traffic Projections for the S-232 Corridor

	2012	2032			2032 with Extended Port Service Hours & TS&W Harmonization		
		Low	Most Likely	High	Low	Most Likely	High
At Wild Horse POE							
AADT	160	195	257	331	224	300	393
Percent Trucks	13%	10%	11%	14%	10%	12%	16%
Along S-232							
AADT	338	383	487	605	416	529	669
Percent Trucks	8%	7%	8%	9%	7%	8%	10%

Source: HDR Analysis

The weighted AADT on this corridor could rise from 338 in 2012 to a potential 669 in 2032 with extended port service hours and TS&W harmonization. There could also be an increase in the percentage of heavy vehicles for the corridor, which may degrade operations. These potential changes in traffic should not degrade the weighted traffic operations below free-flow conditions (LOS A). Individual locations within the corridor may experience higher degradation in operations than the overall weighted average operations.

Projections of highest hourly traffic at Count Site 2-15 (JCT County Road 250 N, just south of the port) in relation to LOS A[9] are shown in Figure ES-10.

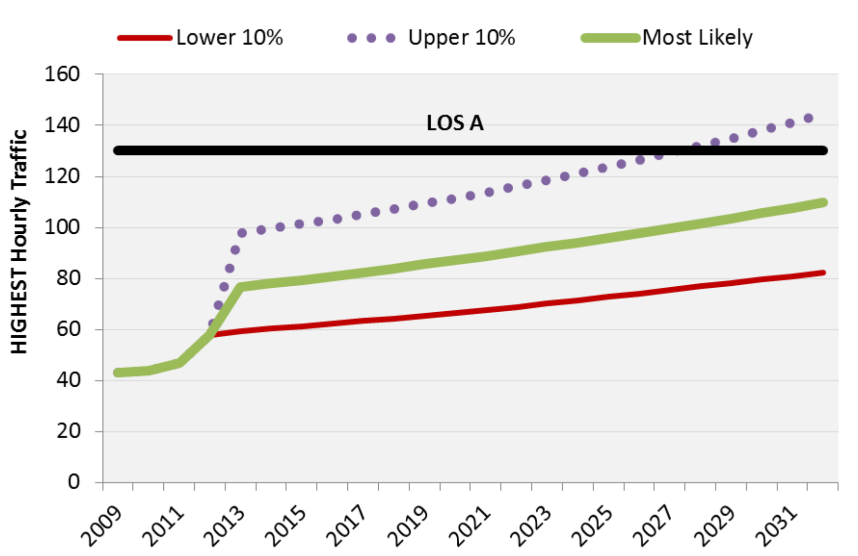

Figure ES-10: AADT Projections in the S-232 Corridor in Relation of LOS A, with Extended Port Service Hours & TS&W Harmonization

Sources: HDR Analysis and TRB (2000)

Only under the most aggressive growth scenario (Upper 10 percent forecast, with Extended Port Service Hours & TS&W Harmonization) would operations during the busiest hour deteriorate slightly below free-flow conditions within the forecast period (shown in ES-10, 2028).

Adequacy of Highway Infrastructure in the US 191 Corridor

Risk adjusted traffic projections for the US 191 corridor are summarized in Table ES-3.

Table ES-3: Summary of Traffic Projections for the US 191 Corridor

	2012	2032			2032 with Extended Port Service Hours & TS&W Harmonization		
		Low	Most Likely	High	Low	Most Likely	High
At Morgan POE							
AADT	70	80	106	134	94	126	159
Percent Trucks	23%	16%	20%	26%	16%	20%	28%
Along US 191							
AADT	183	202	243	296	216	264	322
Percent Trucks	15%	13%	14%	17%	13%	15%	19%

Source: HDR Analysis

[9] 130 vehicles per hour, determined with default values for a Class 1 Two-lane Rural Highway from TRB (2000)

The weighted AADT on this corridor could rise from 183 in 2012 to a potential 322 in 2032 with extended port service hours and TS&W harmonization. There could also be an increase in the percentage of heavy vehicles for the corridor, which may degrade operations. These potential changes in traffic should not degrade the weighted traffic operations below free-flow conditions (LOS A). Individual locations within the corridor may experience higher degradation in operations than the overall weighted average operations.

Projections of highest hourly traffic at Count Site 1-4 (JCT Border Road, just south of the port) in relation to LOS A are shown in Figure ES-11. Throughout the forecast period, operations during the busiest hour are expected to remain below highway capacity.

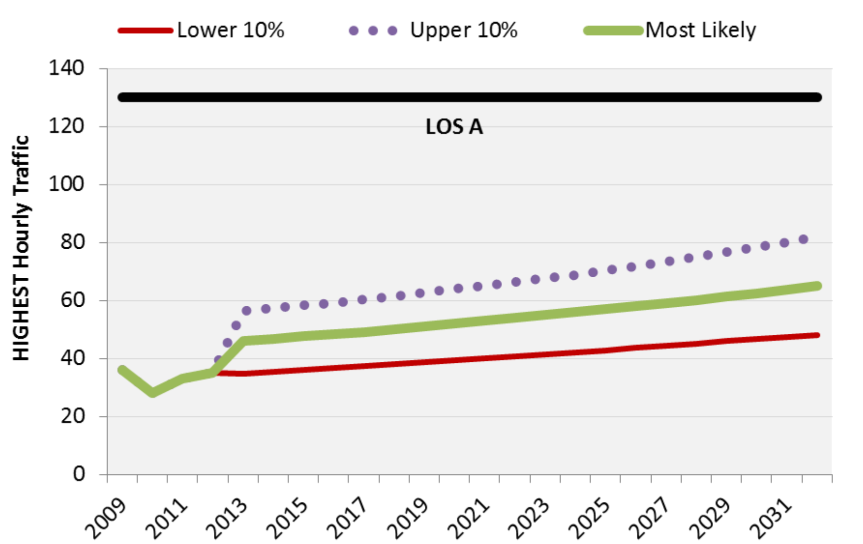

Figure ES-11: AADT Projections in the US 191 Corridor in Relation of LOS A, with Extended Port Service Hours & TS&W Harmonization

Source: HDR Analysis and TRB (2000)

Research Conclusions

It is anticipated that the existing highway infrastructure in Montana will be adequate to handle the potential increase in overall traffic, as well as the potential increase of truck traffic for both corridors of interest, S-232 and US 191. AADT and truck percentages are expected to increase in the future. However, should the existing pavement and geometric conditions be maintained, these potential changes should not degrade the weighted traffic operations below free-flow conditions (LOS A). Individual locations within the corridor may experience higher degradation in operations than the overall weighted average operations. Traffic operations along the highway segments immediately adjacent to the ports are expected to remain below free-flow conditions through 2032. Only under the most aggressive growth scenario would traffic conditions south of Wild Horse deteriorate below LOS A in the busiest hour, in 2028. Finally, for both corridors, available crash data do not suggest any deterioration in safety performance over time.

1 INTRODUCTION AND BACKGROUND

This document is the Final Report for Phase 2 of a study initiated in 2009 on the Impacts of Increased Canadian Economic Development (ICED) on Northern Montana Highways. The findings of Phase 1 of the study are summarized in a final report dated March 2010 and available through the State of Montana Department of Transportation (MDT), at http://www.mdt.mt.gov/research/projects/mcs/canada_impact_nhwy.shtml (last accessed October 3, 2014)[10].

1.1 Background

During the last few decades, international trade has become an increasingly important driver of economic growth. Countries that effectively participate in trade tend to attract foreign investment and experience higher growth than countries that fail to integrate well into the global economy[11]. In the U.S., international trade in goods and services as a percentage of Gross Domestic Product (GDP) has doubled over the past 40 years (from 15 percent in the mid-seventies to 30 percent today). Growth in international trade has been fueled by cost reductions and efficiencies in technology, transportation, and communications. As national economies become increasingly interdependent, this trend is expected to continue.

Canada is the main trading partner of the U.S. and trade has been and is expected to continue to be a growing part of both economies. While the 2008 recession put a damper on cross-border trade, commodity flows have rebounded in recent years, in particular exports to Alberta. And planning for infrastructure improvements requires that agencies look beyond short-term fluctuations in economic activity and traffic, to be prepared to seize future opportunities and consider the investments that will serve long-term needs.

The Ports of Entry (POEs) and their connections to highway corridors within the state of Montana provide a vital link between the U.S. and the provinces of Alberta and Saskatchewan. The importance of this link is demonstrated by the correlation between regional economic activity and trade flows through Montana's border, as well as by the mix of commodities and origin-destination pairs served by these ports.

[10] In this document, Phase 1 of the study is referred to as the ICED 1 Study or the 2010 ICED Study. The final report prepared in Phase 1 is cited as MDT (2010).

[11] The economic literature provides ample evidence on the relationship between trade and economic growth; see for example Wacziarg and Welch (2008).

1.2 The 2010 ICED Study

The 2010 ICED Study evaluated the impacts of Canadian economic development on transportation demand across the border, with the objective of forecasting future truck and commercial auto traffic volumes at Montana ports and connecting roadways. The POEs and highways under consideration stretched from the Port of Sweet Grass / Coutts to the Port of Raymond / Regway (Figure 1). The study assessed the impacts of increased traffic on all north-south roadway corridors providing access to these ports.

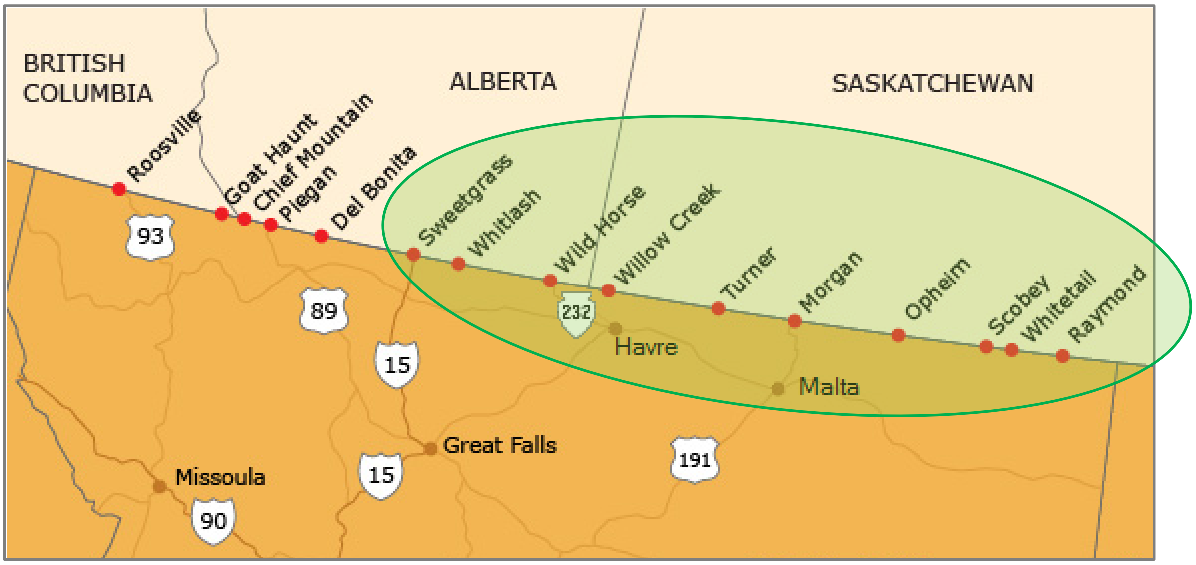

Figure 1: Ports of Entry Considered in the ICED I Study

Source: Adapted from TBWG (2013)

The ICED 1 Study estimated that Montana's major Canadian trading partners would experience strong economic growth over the following 20 years. Alberta's median GDP forecast was to increase from $228 billion in 2008 to $285 billion by 2020 (in real 2009 dollars), an average annual growth rate of 2.0 percent. Similarly, Saskatchewan's GDP was expected to grow from $48 billion in 2008 to $60 billion in 2020, an average annual growth rate of 1.9 percent (MDT 2010).

The study also projected that total imports by truck through Montana's POEs from Saskatchewan and Alberta would reach $5.8 billion in 2020, an increase of 1.4 percent annually compared to 2008 volumes. This was expected to translate into an increase of 565,300 tons of freight shipped across Montana POEs over a 20-year period. Finally, it was determined that Secondary Highway 232 (connecting US 2 to the POE at Wild Horse) and US Highway 191 (connecting US 2 to Morgan) would witness the fastest traffic growth between 2010 and 2030 (MDT 2010).

1.3 Objectives of Phase 2

The primary objective of Phase 2 is to determine whether highway infrastructure in Montana is capable of supporting additional 16-hour 7-days-a-week ports of entry at Wild Horse and Morgan. Secondary objectives include the production of traffic forecasts along the S-232 and US 191 corridors, while considering the impacts of Canadian economic development (in particular from energy investments in Alberta and Saskatchewan); planned infrastructure improvements; restructuring of the Canadian wheat industry; and the potential harmonization of truck size and weight regulations.

More specifically, the scope of work for Phase 2 includes:

- Development of 20-year forecasts of cross-border commodity flows and commercial traffic under alternative policy, operational and economic growth assumptions;
- Documentation of existing conditions and assessment of highway infrastructure needs along two corridors connecting US 2 with the POE at Wild Horse through S-232, and the POE at Morgan through US 191; and
- Preparation of a final report summarizing all research findings.

Phase 2 comprises a total of four tasks, as follows:

- Task 1: Update Data and Projections from the 2010 ICED Study;
- Task 2: Assess the Traffic Impacts of POE Operations, Economic Growth and Planned Infrastructure Improvements;
- Task 3: Assess the Conditions and Adequacy of Existing Highway Infrastructure in Montana; and
- Task 4: Prepare Final Report.

The initial scope of work for Phase 2 included two additional tasks:

- Development of Highway Infrastructure Improvement Scenarios for Montana (in order to handle the added traffic volumes, if deemed necessary); and
- Estimation of the Costs and Benefits associated with the Proposed Highway Infrastructure Improvements in Montana.

Upon completion of Tasks 1, 2 and 3, MDT decided not to move forward with the additional tasks, as the traffic projections developed by the Research Team did not justify the need for infrastructure improvements.

1.4 Approach Overview

The general approach used in Task 1 (*Update Data and Projections*) includes two main components: desktop research and interviews.

- A number of publicly available data sources have been queried to update the socio-economic data series used in Phase 1. They include various ministries in Alberta and Saskatchewan (e.g., the Ministry of Energy, the Ministry of Infrastructure, and the Ministry of Transportation); the Montana Department of Commerce; the Bureau of Business and Economic Research at the University of Montana; the U.S. Census Bureau; the U.S. Bureau of Transportation Statistics; the U.S. Bureau of Economic Analysis; the U.S. Bureau of Labor Statistics; Statistics Canada and the Conference Board of Canada.

- A series of telephone interviews were conducted with industry representatives and subject matter experts in northern Montana, Alberta and Saskatchewan. The primary purpose of these interviews was to help re-evaluate the assumptions used in the 2010 ICED Study and provide inputs to the forecasts of economic activity and cross-border freight flows.

As in Phase 1, the desktop research focused on six sectors of the economy: Energy, Agriculture, Tourism, Construction, Manufacturing, and Trade. Interviews were conducted with representatives from the Agriculture, Mining, Tourism and Transportation sectors. Subject matter experts in regional economic development were interviewed as well.

Not all data series (and associated tables and charts) included in the Final Report for Phase 1 have been updated. The data and analysis herein are more directly related to U.S. – Canada trade and commercial traffic. In some places, the study area itself has been redefined to provide a closer look at the two highway corridors of interest.

The general approach used in Task 2 (*Assess the Traffic Impacts of POE Operations, Economic Growth and Planned Infrastructure Improvements*) involved desktop research, interviews with industry representatives and subject matter experts, and the use of a spreadsheet-based traffic forecasting tool developed during the 2010 ICED Study.

- A number of publications (including peer-reviewed journal articles, research reports by State and Federal agencies, working papers, and industry newsletters) were used in the assessment and quantification of impacts. Survey results provided by U.S. Customs and Border Protection were also used, in particular for appraising the effects of extended port service hours.

- The assessment also relied on data and professional opinions gathered during the stakeholder interviews conducted in Task 1. Interviews were particularly useful in understanding the nature of impacts and determining their general magnitude (e.g., small/medium/large), but not so much in quantifying them.

- The effects of economic growth and industry restructuring were assessed with the spreadsheet-based forecasting tool developed in Phase 1 and updated to reflect changes in forecasting assumptions and parameter values. The tool was also extended to facilitate the simulation of additional impacts, including CWB reforms and the harmonization of truck size and weight regulations.

The analysis conducted in Task 3 (*Assess the Conditions and Adequacy of Existing Highway Infrastructure in Montana*) relied primarily on: i) data provided by MDT, supplemented with information collected online, through desktop research or interviews; ii) the research findings developed in Tasks 1 and 2; and iii) professional judgment.

1.5 Plan of this Report

After this introductory chapter, Chapter 2 examines socio-economic data for Montana, Alberta and Saskatchewan in order to identify historical patterns of growth and emerging trends. Chapter 3 provides a detailed analysis of six economic sectors: Energy, Agriculture, Tourism, Construction, Manufacturing, and Trade. Chapter 4 focuses on trade flows between the U.S. and Canada, by port, mode and commodity. Chapter 5 provides a description of the forecasting methodology and tool used for assessing the effects of economic growth and other economic and policy changes. The chapter relies heavily on material (text, figures and tables) developed during Phase 1 of the study, and updated where necessary. Chapter 6 summarizes the research undertaken to assess the potential impacts of extended service hours at Wild Horse and Morgan, reforms of the CWB, and harmonization of truck size and weight regulations. The traffic projections derived from application of the forecasting tool and research findings can be found in Chapter 7. The chapter provides traffic forecasts for all Phase 1 ports of entry combined and for the ports at Wild Horse and Morgan separately. Traffic projections for S-232 (between US 2 and Wild Horse) and US 191 (between US 2 and Morgan) are also provided in Chapter 7. Chapter 8 describes existing conditions along the two highway corridors; while Chapter 9 provides estimates of future conditions under different operational and policy scenarios. Chapter 10 concludes with a summary of findings and lessons learned.

The report also includes a series of technical appendices. Detailed interview findings can be found in Appendix A. Appendix B provides additional information on major capital projects in Alberta and Saskatchewan. Cross-border freight projections from the FHWA Freight Analysis Framework are summarized in Appendix C. Appendices D and E include supplementary data tables on cross-border traffic; while Appendix F summarizes available wait time data. Appendix G includes traffic data for selected highway segments in the corridors of interest. Tornado diagrams summarizing the impacts of various risk factors on the traffic forecasts can be found in Appendix H. Appendix I defines some of the highway performance measures used in this report. A summary of safety data in the S-232 and US 91 corridors is provided in Appendix J. An overview of the infrastructure improvements planned or underway in the corridors can be found in Appendix K.

2 OVERVIEW OF THE REGIONAL ECONOMY

This chapter provides an overview of the economies of Montana, Alberta and Saskatchewan (defined in this chapter as the "region"), through a series of indicators related to population, employment, income, and gross domestic product. To enhance readability, data are presented in tabular form for selected years only (2002 and 2008 – 2012); while more complete data series are shown as line or bar charts.

2.1 Population Growth

Table 1 provides estimates of total population in Montana, Alberta and Saskatchewan. In 2012, the region was home to almost 6 million people; with almost two thirds residing in Alberta.

Table 1: Regional Population by State or Province, in thousands

State / Province	2002	2008	2009	2010	2011	2012
Montana	912	976	984	991	998	1,005
Alberta	3,128	3,585	3,673	3,724	3,778	3,874
Saskatchewan	997	1,016	1,029	1,044	1,058	1,080
Region Total	**5,037**	**5,578**	**5,686**	**5,759**	**5,834**	**5,959**

Sources: U.S. Census Bureau, Statistics Canada

Over the past decade, population growth has been the strongest in Alberta and Saskatchewan, and lower but steady in Montana. While the region's population grew by about 1 million (from 5.03 million people in 2002 to 5.96 million in 2012), only 10 percent of that increase occurred in Montana, where population grew by less than 100,000. Annual growth rates by state or province can be found in Table 2. Estimates of population growth in the United States and Canada, as well as in neighboring state North Dakota, are added for comparison.

Table 2: Annual Population Growth in the Region, by State or Province

State / Province	2002-2008 (Annualized)	2008-2009	2009-2010	2010-2011	2011-2012
Montana	1.2%	0.8%	0.7%	0.7%	0.7%
Alberta	2.3%	2.4%	1.4%	1.5%	2.5%
Saskatchewan	0.3%	1.3%	1.4%	1.3%	2.1%
Region Average	**1.7%**	**1.9%**	**1.3%**	**1.3%**	**2.1%**
United States	0.9%	0.9%	0.8%	0.7%	0.7%
North Dakota	0.5%	1.1%	1.4%	1.5%	2.2%
Canada	1.0%	1.2%	1.2%	1.0%	1.1%

Sources: HDR Calculations based on U.S. Census Bureau and Statistics Canada

In recent years, the rate of growth in Montana's population has remained more or less constant, between 0.7 and 0.8 percent. Alberta has seen the strongest growth, with annual growth rates in excess of 1.4 percent every year since 2002. Population growth in Saskatchewan has accelerated markedly in the second half of the decade, with growth exceeding 2.0 percent between 2011 and 2012 (Figure 2). A similar acceleration has been observed in North Dakota, the nation's fastest growing state in 2012.

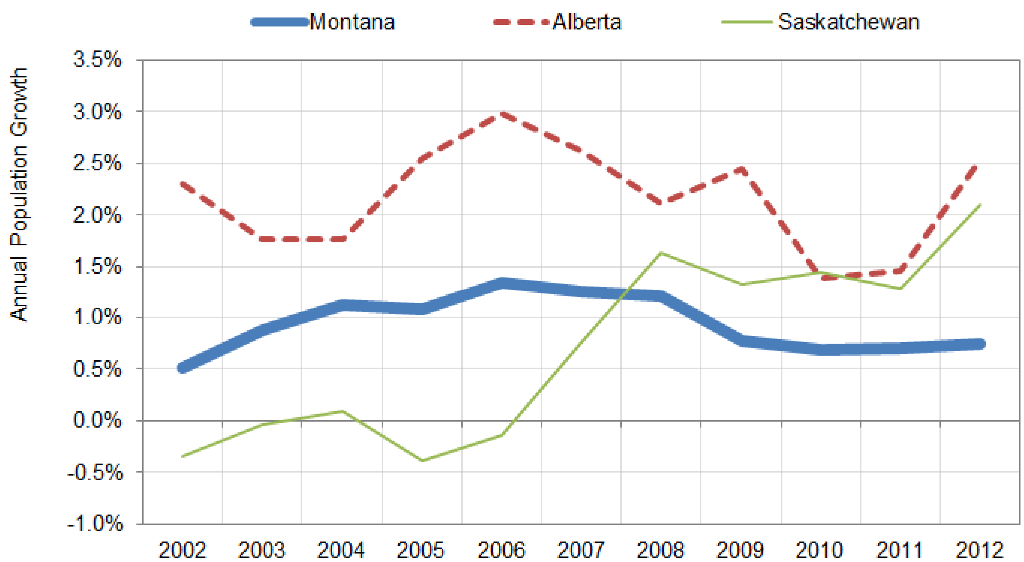

Figure 2: Annual Population Growth in the Region, by State or Province, 2002 – 2012

Sources: HDR Calculations based on U.S. Census Bureau and Statistics Canada

2.2 Labor Force, Employment and Unemployment

Table 3 provides estimates of the number of people in the civilian labor force (i.e., available for work, employed or unemployed) within the region.

Table 3: Regional Labor Force by State or Province, in thousands

State / Province	2002	2008	2009	2010	2011	2012	2002-2008 (Annualized)	2008-2012 (Annualized)
Montana	466	510	495	496	499	508	0.9%	-0.1%
Alberta	1,771	2,131	2,167	2,157	2,215	2,254	2.4%	1.4%
Saskatchewan	498	535	546	553	554	564	1.2%	1.3%
Region Total	**2,735**	**3,175**	**3,208**	**3,206**	**3,268**	**3,325**	**2.0%**	**1.2%**

Sources: Bureau of Labor Statistics, Statistics Canada

As can be seen in Table 3, the labor force in Montana is still below its 2008 level (508,000 persons in 2012 vs. 510,000 in 2008); while the labor forces of Alberta and Saskatchewan have grown at an average annual rate of 1.4 and 1.3 percent respectively since the onset of the Great Recession. Estimates of labor force participation (i.e., number of people in the labor force divided by total population) can be found in Table 4.

Table 4: Labor Force as a Percent of Total Population, by State or Province

State / Province	2002	2008	2009	2010	2011	2012
Montana	51.1%	52.2%	50.3%	50.0%	50.0%	50.5%
Alberta	56.6%	59.4%	59.0%	57.9%	58.6%	58.2%
Saskatchewan	50.0%	52.6%	53.0%	53.0%	52.3%	52.2%
Region Average	**54.3%**	**56.9%**	**56.4%**	**55.7%**	**56.0%**	**55.8%**
United States	50.4%	50.7%	50.2%	49.7%	49.3%	49.4%
North Dakota	54.2%	56.3%	55.8%	55.7%	55.8%	56.0%
Canada	52.8%	54.6%	54.3%	54.3%	54.2%	54.1%

Sources: HDR Calculations based on Bureau of Labor Statistics, U.S. Census Bureau, and Statistics Canada

Recent changes in total employment are summarized in Table 5. Since 2010, employment has been growing steadily across the region, with growth rates in excess of 2.0 percent in all three states / provinces between 2011 and 2012 (+2.3 percent in Montana; +2.7 percent in Alberta; and +2.1 percent in Saskatchewan).

Table 5: Regional Employment by State or Province, in thousands

State / Province	2002	2008	2009	2010	2011	2012	2002-2008 (Annualized)	2008-2012 (Annualized)
Montana	445	487	465	462	466	477	0.7%	-0.5%
Alberta	1,677	2,054	2,025	2,017	2,094	2,150	2.5%	1.1%
Saskatchewan	470	513	520	524	526	537	1.3%	1.2%
Region Total	**2,592**	**3,053**	**3,010**	**3,003**	**3,086**	**3,164**	**2.0%**	**0.9%**

Sources: Bureau of Labor Statistics, Statistics Canada

Figure 3 illustrates the changes in total employment (across all three states / provinces) between 1999 and 2012. The effects of the Great Recession and subsequent "rebound" are clearly seen in the chart. Also shown in the chart, is the share of Montana employment in total regional employment; which has declined steadily since 1999 (from 18 to 15 percent).

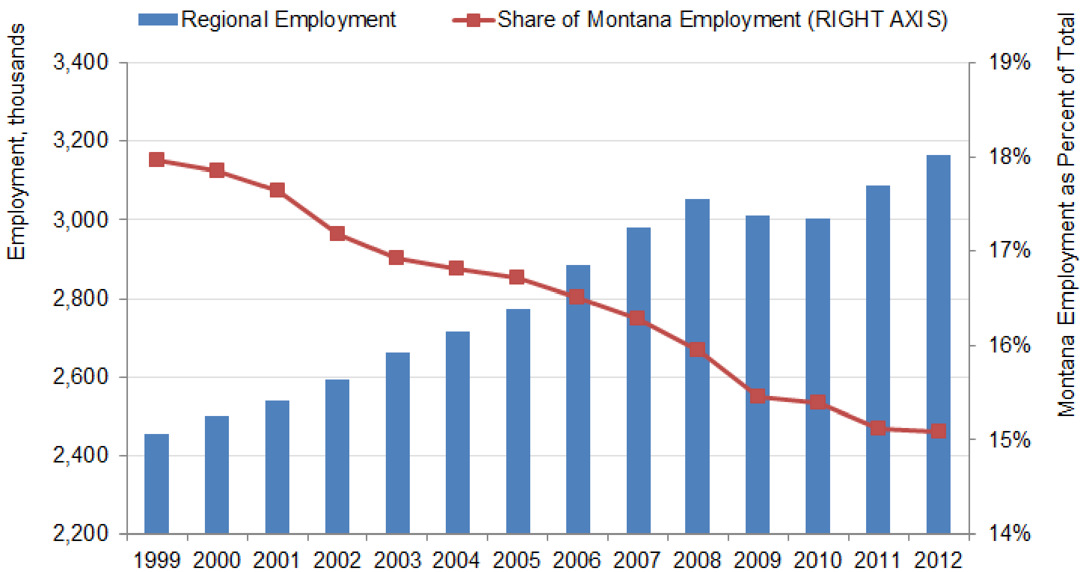

Figure 3: Total Regional Employment and Share of Montana in Total Employment, 1999 – 2012

Sources: HDR Calculations based on Bureau of Labor Statistics, U.S. Census Bureau, and Statistics Canada

As can be seen in Table 6, the rate of unemployment in the region has fluctuated greatly over the past decade, with a peak at 6.3 percent (on average, for the region) in 2010 and significant improvements in all three states / provinces after that.

Table 6: Rate of Unemployment by State or Province

State / Province	2002	2008	2009	2010	2011	2012
Montana	4.5%	4.5%	6.0%	6.7%	6.6%	6.0%
Alberta	5.3%	3.6%	6.6%	6.5%	5.5%	4.6%
Saskatchewan	5.7%	4.1%	4.8%	5.2%	5.0%	4.7%
Region Average	**5.2%**	**3.8%**	**6.2%**	**6.3%**	**5.6%**	**4.8%**
United States	5.8%	5.8%	9.3%	9.6%	8.9%	8.1%
North Dakota	3.5%	3.1%	4.1%	3.8%	3.5%	3.1%
Canada	7.7%	6.1%	8.3%	8.0%	7.5%	7.2%

Sources: Bureau of Labor Statistics, Statistics Canada

Throughout the period, the average unemployment rate in the region has remained significantly lower than in the United States or Canada (overall). The remarkable performance of Alberta and Saskatchewan, where the rate of unemployment was slightly above 4.5 percent in 2012, still pales in comparison to North Dakota, where unemployment remained below 4 percent during most of the period. Annual variations in the regional rate of unemployment are also illustrated in Figure 4.

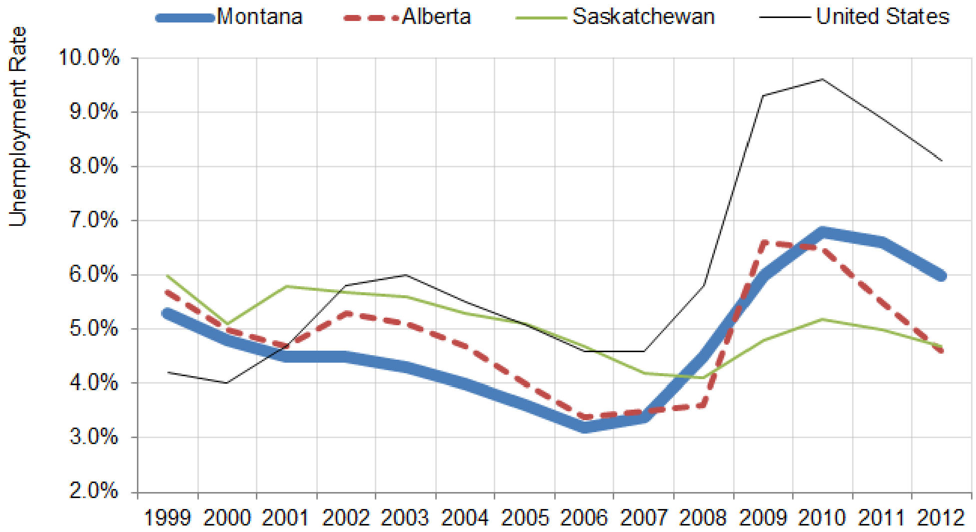

Figure 4: Rate of Unemployment in the Study Area and the United States, 1999 – 2012

Sources: Bureau of Labor Statistics, Statistics Canada

Estimates of regional employment by economic sector are provided in Table 7 (Montana) and Table 8 (Alberta and Saskatchewan, combined) on the next page. 2-digit codes from the North American Industry Classification System (NAICS) are used to summarize the distributions in both tables. Note, however, that the estimates reported for Canada are broader in scope than those reported for Montana; which explains some of the discrepancies observed in the sectorial distributions. In addition, the sectorial data (Table 7) and labor force data (Tables 3, 5 and 6) for Montana are based on different survey programs. This explains why the estimates of total employment in the last row of Table 7 do not match those shown in Table 5.

- Labor force data for Montana (Tables 3, 5 and 6) are derived from the Local Area Unemployment Statistics (LAUS) program of the U.S. Bureau of Labor Statistics. LAUS data pertain to persons (a person is included only once); are household-based data (based on place of residence); and include all self-employed, unpaid family, domestic, and agricultural workers.

- Sectorial data for Montana (Table 7) are based on the Quarterly Census of Employment and Wages (QCEW). QCEW data pertain to *jobs* (a person may be included more than once if they hold more than one job); are establishment-based data (based on place of work); and *do not include self-employed and unpaid family workers*. They include some, but not all, domestic and agricultural workers.

- Sectorial data for Canada (Table 8) represent the total number of *persons* who, during the reference week, worked for pay or profit, or performed unpaid family work or had a job but were not at work (due to own illness or disability, personal or family responsibilities, labor dispute, vacation, or other reasons).

Table 7: Employment by NAICS Sector in Montana, 2002 and 2012

NAICS Code	Sector	Employment ('000s)		Percent of Total	
		2002	2012	2002	2012
11	Agriculture, Forestry, Fishing and Hunting	4.3	4.7	1.1%	1.1%
21	Mining, Quarrying, and Oil and Gas Extraction	5.1	8.7	1.3%	2.0%
22	Utilities	2.9	3.2	0.8%	0.7%
23	Construction	21.5	23.1	5.5%	5.4%
31,32,33	Manufacturing	20.0	17.5	5.2%	4.1%
42	Wholesale Trade	15.4	16.3	4.0%	3.8%
44,45	Retail Trade	53.8	55.3	13.9%	12.8%
48,49	Transportation and Warehousing	10.1	11.4	2.6%	2.7%
52	Finance and Insurance	14.2	14.7	3.7%	3.4%
53	Real Estate and Rental and Leasing	5.0	5.1	1.3%	1.2%
54	Professional, Scientific, and Technical Services	16.1	19.5	4.1%	4.5%
55,56	Business, Building and Other Support Services	15.9	21.5	4.1%	5.0%
61	Educational Services	3.4	4.4	0.9%	1.0%
62	Health Care and Social Assistance	48.4	61.2	12.5%	14.2%
51,71	Information, Culture and Recreation	16.2	17.6	4.2%	4.1%
72	Accommodation and Food Services	42.4	47.2	10.9%	11.0%
81	Other Services (except Public Administration)	15.3	16.4	3.9%	3.8%
91-92	Public Administration	77.8	82.4	20.0%	19.1%
99	Unclassified	0.4	0.2	0.1%	0.0%
	Total Employment	**388.2**	**430.3**	**100.0%**	**100.0%**

Source: Bureau of Labor Statistics QCEW

Table 8: Employment by NAICS Sector in Alberta and Saskatchewan Combined, 2002 and 2012

NAICS Code	Sector	Employment ('000s)		Percent of Total	
		2002	2012	2002	2012
11	Agriculture, Forestry, Fishing and Hunting	115.9	100.3	5.4%	3.7%
21	Mining, Quarrying, and Oil and Gas Extraction	107.3	197.9	5.0%	7.4%
22	Utilities	20.6	26.5	1.0%	1.0%
23	Construction	164.7	271.0	7.7%	10.1%
31-33	Manufacturing	178.8	165.7	8.3%	6.2%
42	Wholesale Trade	77.3	102.4	3.6%	3.8%
44-45	Retail Trade	246.0	300.7	11.5%	11.2%
48-49	Transportation and Warehousing	122.7	142.4	5.7%	5.3%
52	Finance and Insurance	74.3	95.2	3.5%	3.5%
53	Real Estate and Rental and Leasing	37.4	38.8	1.7%	1.4%
54	Professional, Scientific, and Technical Services	139.2	182.9	6.5%	6.8%
55-56	Business, Building and Other Support Services	67.1	86.0	3.1%	3.2%
61	Educational Services	146.5	171.9	6.8%	6.4%
62	Health Care and Social Assistance	212.7	298.7	9.9%	11.1%
51-71	Information, Culture and Recreation	87.7	90.5	4.1%	3.4%
72	Accommodation and Food Services	150.9	164.2	7.0%	6.1%
81	Other Services (except Public Administration)	105.1	131.9	4.9%	4.9%
91	Public Administration	92.0	119.9	4.3%	4.5%
99	Unclassified	0.0	0.0	0.0%	0.0%
	Total	**2,146.2**	**2,686.9**	**100.0%**	**100.0%**

Source: Statistics Canada

Based on the above employment data, in 2012, the five largest sectors of the economy of Montana were:

- Public Administration (19.1% of total employment),
- Health Care and Social Assistance (14.2%),
- Retail Trade (12.8%),
- Accommodation and Food Services (11.0%), and
- Construction (5.4%).

The five largest economic sectors in Alberta and Saskatchewan (combined) were:

- Retail Trade (11.2%),
- Health Care and Social Assistance (11.1%),
- Construction (10.1%),
- Mining, Quarrying, and Oil and Gas Extraction (7.4%), and
- Professional, Scientific, and Technical Services (6.8%).

In Montana, the sectors that grew the fastest between 2002 and 2012 were:

- Mining, Quarrying, and Oil and Gas Extraction (+5.5% per year, on average),
- Business, Building and Other Support Services (+3.1%),
- Educational Services (+2.6%),
- Health Care and Social Assistance (+2.4%), and
- Professional, Scientific, and Technical Services (+1.9%).

And the fastest growing sectors north of the border (Alberta and Saskatchewan combined) were:

- Mining, Quarrying, and Oil and Gas Extraction (+6.3% per year, on average),
- Construction (+5.1%),
- Health Care and Social Assistance (+3.5%),
- Wholesale Trade (+2.9%), and
- Professional, Scientific, and Technical Services (+2.8%).

2.3 Wages and Disposable Income

Estimates of average weekly wage rates in the region are summarized in Table 9. To facilitate comparisons between the United States and Canada, the estimates for Canada were converted to U.S. Dollars using Purchasing Power Parity exchange rates obtained from the Organization of Economic Development and Cooperation (OECD)[12].

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[12] OECD (2013)

Table 9: Average Weekly Wage Rates by State or Province, in Nominal U.S. Dollars, at PPP Exchange Rates

State / Province	2002	2008	2009	2010	2011	2012	2002-2012 (Annualized)
Montana	$500	$640	$649	$665	$688	$713	3.6%
Alberta	$557	$733	$777	$777	$786	$834	4.1%
Saskatchewan	$477	$618	$667	$686	$696	$737	4.5%
Region Average	**$533**	**$699**	**$738**	**$744**	**$756**	**$799**	**4.1%**
United States	$707	$876	$876	$899	$924	$948	3.0%
North Dakota	$511	$675	$692	$733	$803	$883	5.6%
Canada	$529	$634	$670	$674	$681	$706	2.9%

Sources: Bureau of Labor Statistics, Statistics Canada, and OECD

As shown in the above table, average weekly wages in the study area remain lower than the national average ($799 per week vs. $948, in 2012), but have grown at a faster rate (+4.1 percent on average per year between 2002 and 2012 vs. +3.0 percent nationally). Nominal growth has been particularly strong between 2011 and 2012 in Alberta and Saskatchewan (+6.0% in both provinces).

The relative growth in average wage rates north of the border is even more pronounced (but somewhat misleading) when converting Canadian dollars into U.S. Dollars at market exchange rates, as illustrated in Figure 5.

Figure 5: Average Weekly Wage Rates by State or Province in 2002 and 2012, in Current U.S. Dollars, at PPP Exchange Rates and Market Exchange Rates

Sources: Bureau of Labor Statistics, Statistics Canada, and OECD

Estimates of disposable personal income[13] per capita in current, local currencies (U.S. Dollars and Canadian Dollars) are provided in Table 10 below. Note that data for Canada are not available for 2011 and 2012.

Table 10: Disposable Personal Income per Capita in the Region, in Current Dollars, Local Currency

State / Province	2002	2008	2009	2010	2011	2012	2002-2012*** (Annualized)
Montana	$22,774	$30,920	$30,695	$31,671	$33,217	$34,813	4.3%
Alberta*	$25,036	$37,400	$36,223	$37,856	n/a**	n/a**	5.3%
Saskatchewan*	$19,110	$29,564	$29,485	$30,583	n/a**	n/a**	6.1%
United States	$28,150	$36,158	$35,629	$36,315	$37,797	$38,968	3.3%
North Dakota	$24,758	$36,891	$36,741	$39,574	$42,379	$49,273	7.1%
Canada*	$22,135	$28,620	$28,650	$29,706	n/a**	n/a**	3.7%

*Notes: * In Canadian Dollars; all other estimates in U.S. Dollars; ** Not Available (Terminated in 2010);*
**** Between 2002 and 2010 in Canada*
Sources: Bureau of Labor Statistics, Statistics Canada

Between 2002 and 2010, disposable income per capita grew by 5.3 percent (in nominal terms) on average per year in Alberta, and by 6.1 percent in Saskatchewan. In contrast, over the same period, per capita income grew by 3.7 percent only in Canada. Similarly, the average annual growth rate in disposable income per capita in Montana is higher than the national average (+4.3 percent vs. 3.3 percent).

2.4 Gross Domestic Product

Estimates of Gross Domestic Product (GDP) in the region are shown in Table 11, in billions of 2005 U.S. Dollars. As before, estimates for the U.S., Canada and neighboring state North Dakota are provided for comparison.

Montana's GDP grew by over 2.0 percent in real terms in 2010, 2011 and 2012. Economic growth north of the border was more sustained, with growth rates in excess of 3.5 percent in both provinces (Alberta and Saskatchewan) in 2011. For the region overall, the estimates below suggest a strong recovery from the 2008 Recession, with average growth rates of 3.6 and 3.9 percent in 2011 and 2012, respectively. In contrast, during the same period, U.S. GDP grew by 1.8 and 2.8 percent.

[13] Disposable personal income is the sum of employee compensation, proprietors' income, rental income, income from interest and dividends, transfer payments, net of social insurance contributions and personal taxes (e.g., income tax).

Table 11: Real Gross Domestic Product in the Study Area, in Billions of 2005 U.S. Dollars at PPP Exchange Rates

State / Province	1997	2002*	2008**	2009	2010	2011	2012
Montana	$24.1	$26.9	$31.9	$31.3	$31.9	$32.7	$33.4
	n/a	2.3%	-0.7%	-2.1%	2.1%	2.4%	2.1%
Alberta	$111.7	$129.3	$160.8	$158.2	$160.8	$167.1	$174.6
	n/a	3.0%	-0.9%	-1.6%	1.7%	3.9%	4.5%
Saskatchewan	$28.5	$29.3	$35.0	$34.6	$35.5	$36.8	$37.8
	n/a	0.6%	2.5%	-1.2%	2.5%	3.6%	2.7%
Region Total	**$164.3**	**$185.5**	**$227.8**	**$224.1**	**$228.3**	**$236.6**	**$245.8**
	n/a	**2.5%**	**-0.4%**	**-1.6%**	**1.9%**	**3.6%**	**3.9%**
United States	$10,140	$11,876	$13,646	$13,263	$13,596	$13,847	$14,232
	n/a	3.2%	-0.3%	-2.8%	2.5%	1.8%	2.8%
North Dakota	$19.4	$22.7	$28.6	$29.5	$31.6	$34.1	$38.7
	n/a	3.2%	8.4%	3.0%	7.2%	7.8%	13.4%
Canada	$885.2	$1,045.2	$1,187.9	$1,188.4	$1,206.9	$1,223.1	$1,250.3
	n/a	3.4%	-0.8%	0.0%	1.6%	1.3%	2.2%

*Note: * Growth rates in this column are average annual growth rates between 1997 and 2002; ** Growth rates in this column are annual growth rates between 2007 and 2008.*
Sources: Bureau of Economic Analysis, Statistics Canada, and OECD

The growth in real GDP between 1990 and 2012 in Alberta and Saskatchewan is illustrated in Figure 6, where growth is expressed as an index (with 1997 GDP = 100).

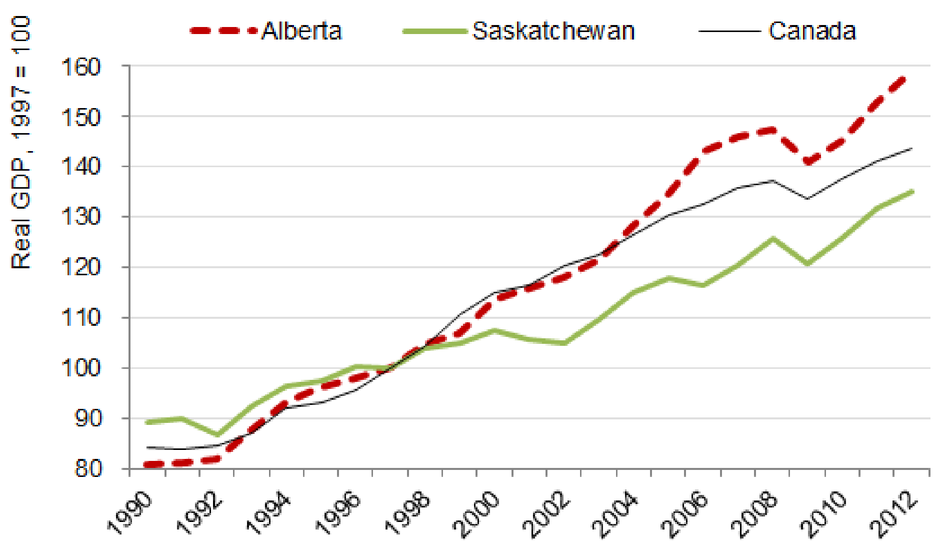

Figure 6: Real GDP Growth Index in Alberta and Saskatchewan, 1990 – 2012

Source: Statistics Canada

Figure 7 provides similar information for Montana, North Dakota and the United States.

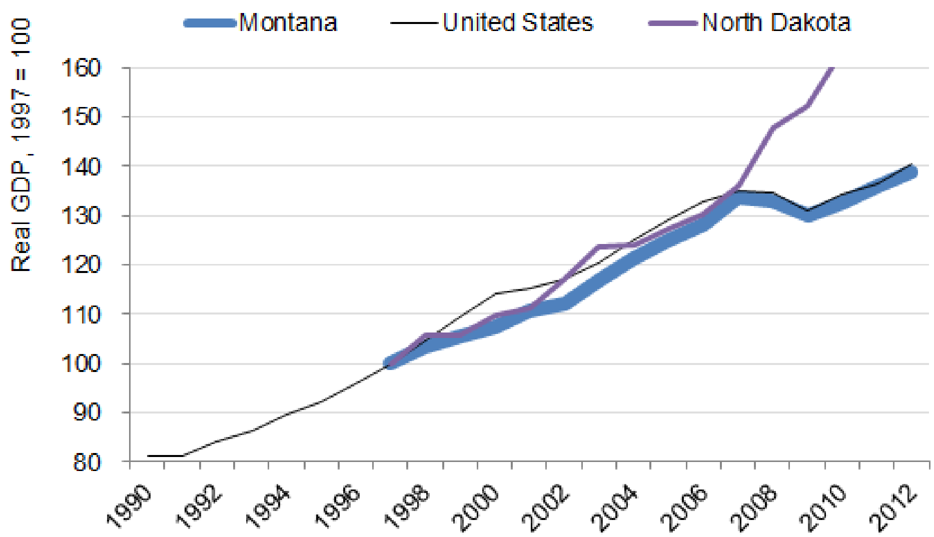

Figure 7: Real GDP Growth in Montana, 1990 – 2012

Source: Bureau of Economic Analysis

A distribution of Montana's Gross Domestic Product by economic sector is illustrated in Figure 8, for 2002 and 2012. In both years, the three sectors contributing most to total value added in the state were: Finance, Insurance, Real Estate and Management of Companies (NAICS Sectors 52, 53 and 55 combined); Public Administration (91); and Health Care and Social Assistance (62).

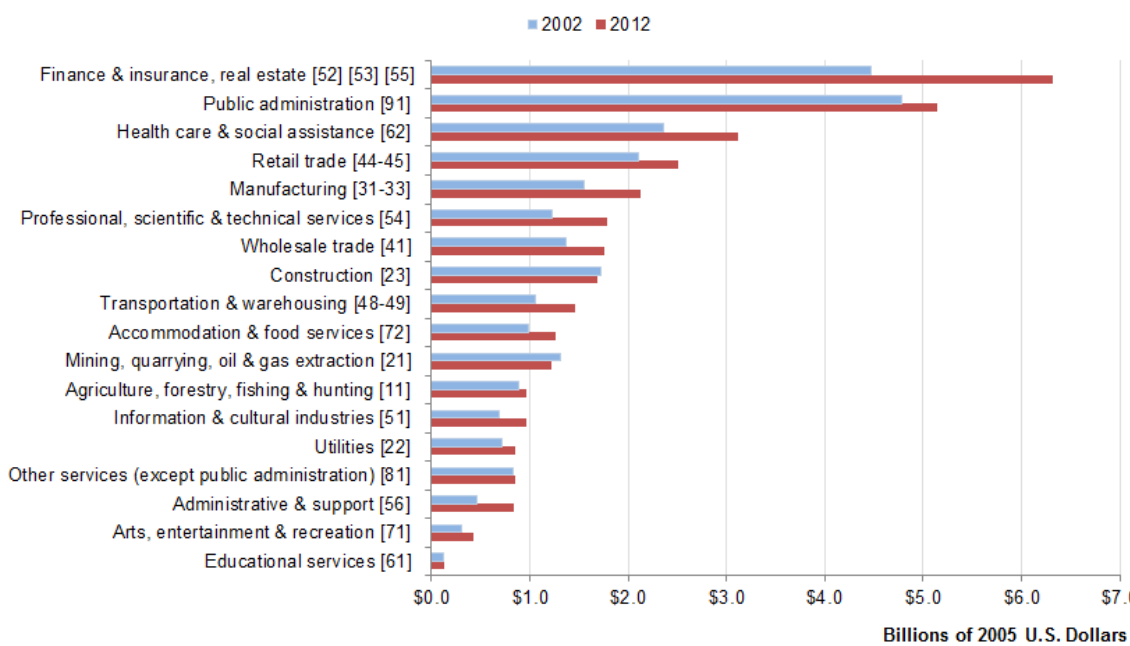

Figure 8: Montana's GDP by NAICS Sector, 2002 and 2012

Source: Bureau of Economic Analysis

The sectors that grew the fastest in relative terms were: Administrative, Support, Waste Management and Remediation Services (NAICS Sector 56, +79 percent); Professional, Scientific, and Technical Services (Sector 54, +46 percent); and Finance, Insurance, Real Estate and Management of Companies (Sectors 52, 53 and 55 combined, +41 percent).

Estimates of Gross Domestic Product by 2-digit NAICS code in Alberta are shown in Figure 9 below. In 2002 and 2012, the two sectors with the largest contribution to the province's GDP were Mining, Quarrying, Oil and Gas Exploration (NAICS Sector 21); and Finance, Insurance, Real Estate and Management of Companies. In 2012, Construction (23) was the third largest sector, well ahead of Manufacturing (31-33), which held the third position in 2002. Construction was also the fastest growing sector during the period, with an average annual growth of 7.5 percent (and an overall growth in excess of 100 percent).

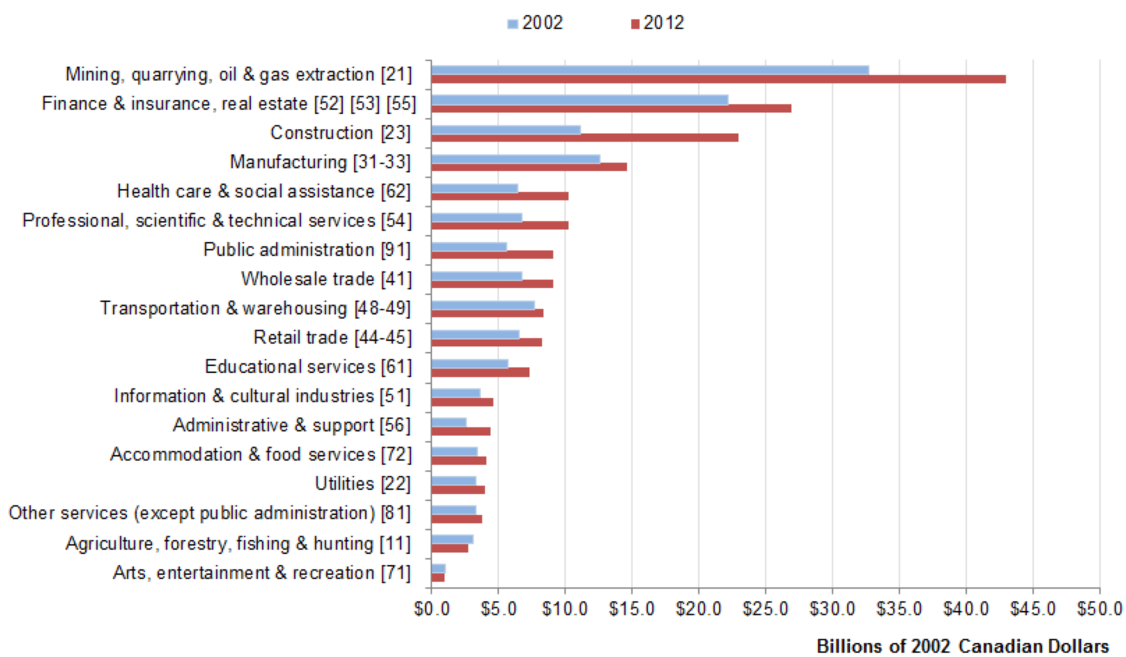

Figure 9: Alberta's GDP by NAICS Sector, 2002 and 2012

Source: Statistics Canada

The same information is provided for Saskatchewan in Figure 10. Over a fourth (27 percent) of total provincial GDP was produced in Sector 21 (Mining, Quarrying, Oil and Gas Exploration) in 2012, compared to slightly more than 15 percent ten years ago. Sector 21 was also among the fastest growing sectors of the economy during that period (with an overall growth in excess of 100 percent). As in Alberta, Construction was the third largest sector in 2012, ahead of Manufacturing (Sectors 31-33) and Agriculture, Forestry, Fishing and Hunting (11).

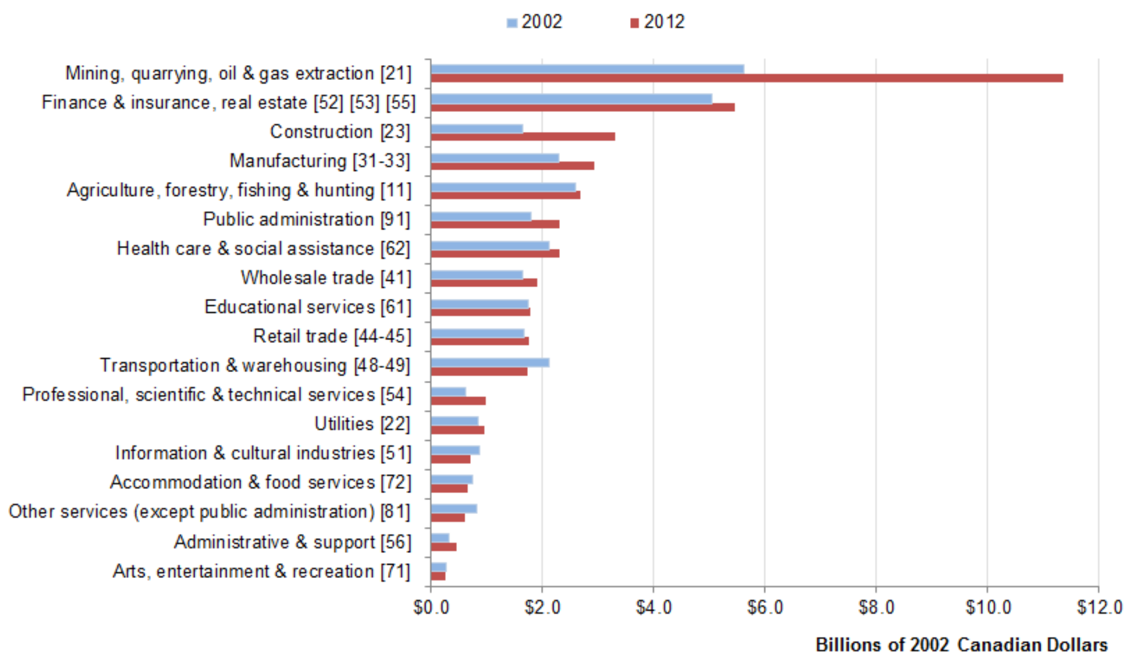

Figure 10: Saskatchewan's GDP by NAICS Sector, 2002 and 2012

Source: Statistics Canada

2.5 Summary of Chapter 2

The main lessons from this overview of the regional economy can be summarized as follows:

1. The region, overall, was better able to weather the effects of the Great Recession than other states and provinces.

2. GDP growth in Alberta and Saskatchewan was particularly strong in recent years as a result of rapid expansions in the oil and gas industry, and the construction sector.

3. Growth in Montana was more subdued, but the state generally fared better than the rest of the Nation, in particular in terms of income growth and unemployment.

4. While the economies of Alberta and Saskatchewan have experienced rapid structural shifts in the past decade, the structure of Montana's economy has remained relatively stable, in terms of GDP and employment.

A more detailed analysis of economic activity by sector is provided in the next chapter, along with projections of output and trade.

3 REGIONAL ECONOMIC OUTLOOK BY SECTOR

This chapter provides detailed information on six sectors of the regional economy: Mining, Quarrying and Oil and Gas Extraction; Agriculture; Construction; Manufacturing; Tourism; and Wholesale and Retail Trade. For each sector, recent trends in employment, earnings and cross-border trade are assessed, and major upcoming projects are discussed. A brief industry outlook is also provided.

3.1 Mining, Quarrying and Oil and Gas Extraction

This section provides an overview of Sector 21 of the North American Industry Classification System (NAICS), as defined in the textbox below.

NAICS 21 – Mining, Quarrying, and Oil and Gas Extraction

This sector comprises establishments primarily engaged in extracting naturally occurring minerals. These can be solids, such as coal and ores; liquids, such as crude petroleum; and gases, such as natural gas. The term "mining" is used in the broad sense to include quarrying, well operations, milling (for example, crushing, screening, washing, or flotation) and other preparation customarily done at the mine site, or as a part of mining activity. Establishments engaged in exploration for minerals, development of mineral properties and mining operations are included in this sector. Establishments performing similar activities, on a contract or fee basis, are also included.

Source: Statistics Canada, http://stds.statcan.gc.ca/naics-scian/2007/cs-rc-eng.asp?criteria=21

3.1.1 Employment

In 2012, the Mining, Quarrying and Oil and Gas Extraction sector was the largest sector (in terms of total value added) in the regional economy. While the sector accounted for only 3.7 percent of Montana's 2012 Gross State Product, it represented 22.1 percent and 27.0 percent of the economies of Alberta and Saskatchewan, respectively (Bureau of Economic Analysis and Statistics Canada). It was also among the fastest growing sectors, regionally.

Between 2001 and 2012, employment in the sector grew at an average annual rate of 5.5 percent in Alberta, 4.8 percent in Saskatchewan and 4.9 percent in Montana (Figure 11). Employment fell in all three provinces between 2008 and 2009 (by 7 percent overall, for the region) but was back to its pre-recession level as early as 2011. In 2012 alone, sectoral employment grew by 14.8 percent in Alberta and 15.2 percent in Montana. Employment growth in Saskatchewan was a lot slower, at 2.1 percent. Between the trough of 2009 and the end of 2012, employment grew by 25.0 percent in Alberta and a staggering 34.5 percent in Montana. Cumulative employment growth during that period was only about 6.1 percent in Saskatchewan.

In 2012, the sector accounted for 8.1 percent of total employment in Alberta; 4.5 percent in Saskatchewan; and 2.0 percent in Montana (Bureau of Labor Statistics and Statistics Canada).

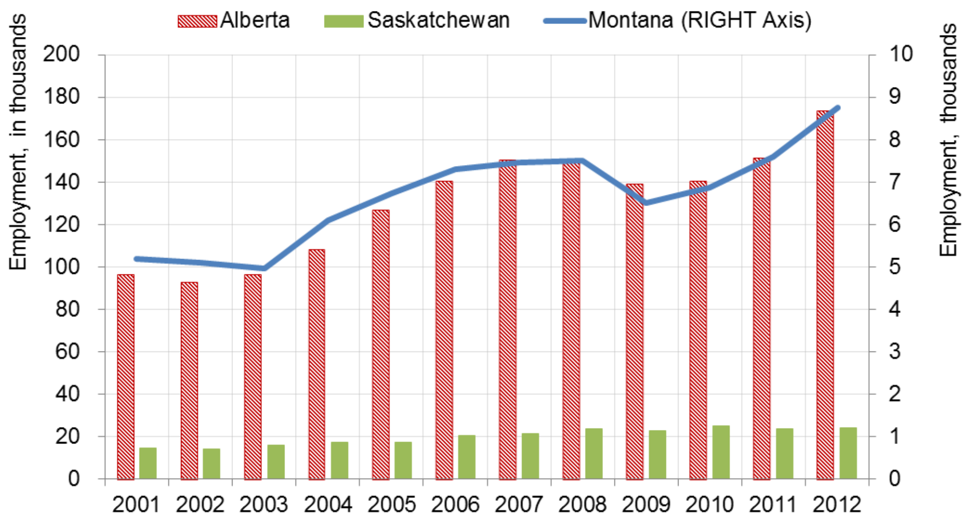

Figure 11: Employment in the Mining, Quarrying and Oil and Gas Extraction Sector, 2001 – 2012

Sources: Bureau of Labor Statistics QCEW, Statistics Canada LFS

Within NAICS Sector 21, Sub-Sector 212 (Mining and Quarrying except Oil and Gas, which includes Coal Mining, Metal Ore Mining and Nonmetallic Mineral Mining and Quarrying) represents a much larger portion of total employment in Saskatchewan than it does in Alberta. Statistics Canada's Labor Force Survey in combination with data reported by the Petroleum Human Resources Council of Canada indicate that in 2012, employment in the sub-sector accounted for about 52 percent of total sectoral employment in Saskatchewan, against only 8 percent in Alberta. The distribution of Sector 21 employment by sub-sector in Montana is illustrated in Figure 12.

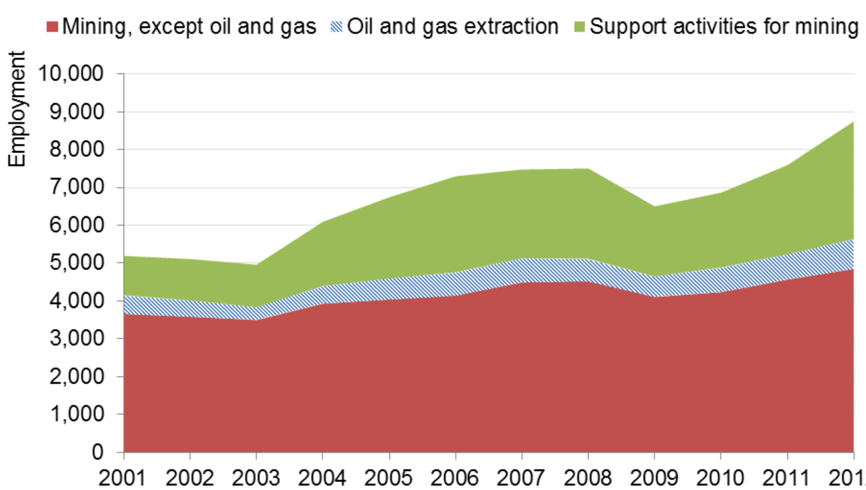

Figure 12: Employment in the Mining, Quarrying and Oil and Gas Extraction Sector by Sub-Sector in Montana, 2001 – 2012

Source: Bureau of Labor Statistics QCEW

3.1.2 Earnings and Value Added

Between 2001 and 2012, average weekly earnings in Sector 21 grew – in nominal terms – at an average annual rate of 4.6 percent in Alberta, 4.7 percent in Saskatchewan, and 4.1 percent in Montana (Figure 13). Nominal growth was particularly strong in 2007 (+7.0 percent overall for the region), 2008 (+7.9 percent) and 2010 (+8.5 percent). And average weekly earnings were only moderately affected by the Great Recession. Throughout the period, average earnings in the sector remained well above the economy-wide national U.S. average (averaged across all sectors of the economy).

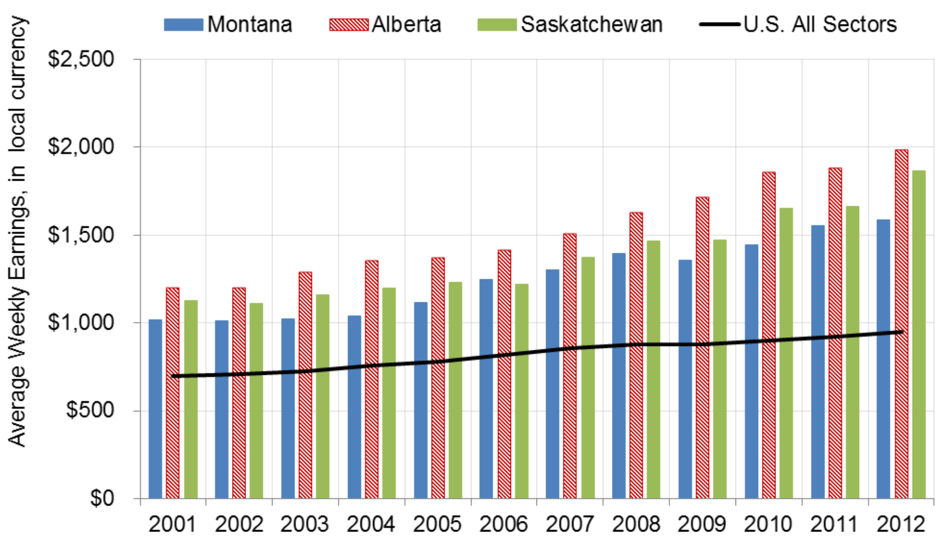

Figure 13: Average Weekly Earnings in the Mining, Quarrying, Oil and Gas Extraction Sector, 2001 – 2012

Source: Bureau of Labor Statistics QCEW, Statistics Canada LFS

Recent growth in total value added in Sector 21 is illustrated in Figure 14. Between 1998 and 2012, real GDP in the sector grew at an average annual rate of 1.8 percent in Alberta, 4.6 percent in Saskatchewan, and 0.1 percent in Montana (Bureau of Economic Analysis; not shown in the chart). In more recent years, between 2009 and 2012, the sector expanded by 15.8 percent overall in Alberta, 35.5 percent in Saskatchewan and 2.6 percent in Montana.

The figure also shows the effects of the 2009 collapse of crude oil prices (illustrated here with spot prices for Brent Crude Oil from the U.S. Energy Information Administration), which particularly affected total value added in Alberta.

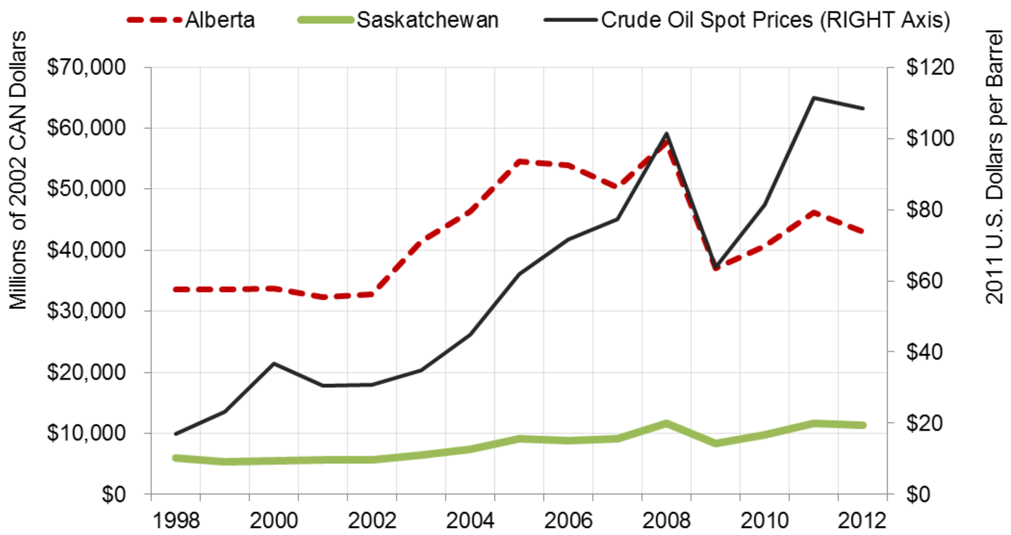

Figure 14: Total Value Added in the Mining, Quarrying, Oil and Gas Extraction Sector by Province, and Crude Oil Prices, 1998 – 2012

Source: Statistics Canada LFS, EIA

3.1.3 International Trade

In 2012, products from the Oil and Gas Extraction sub-sector represented over 67 percent of Alberta's total international exports, valued at C$95.4 billion (Figure 15). The value of these exports was, of course, directly influenced by commodity prices – as illustrated in the previous section. Thus, between 2007 and 2008, as international oil prices were surging, the total value of oil exports from Alberta increased by 44 percent, to reach nearly C$80 billion. This was followed by an equally abrupt decline in 2009 and by a steep recovery in 2010 and 2011.

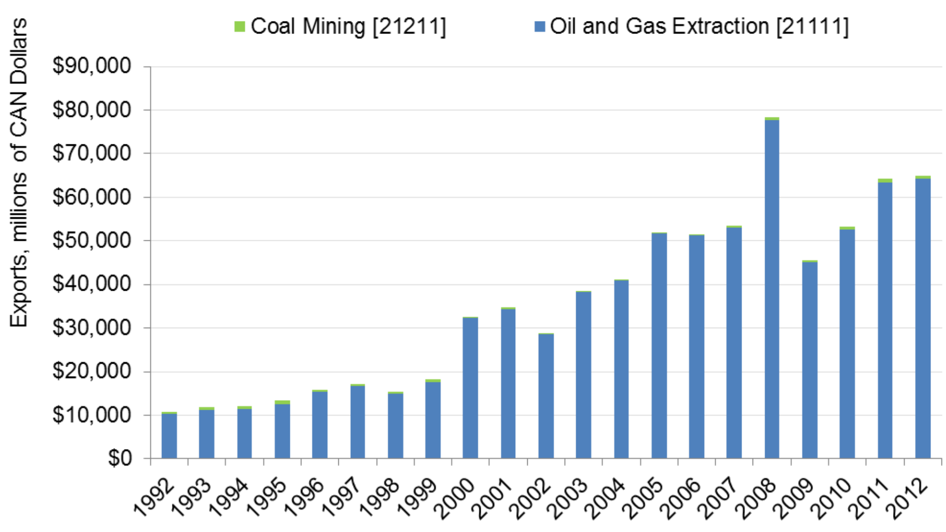

Figure 15: Alberta Exports of Oil, Gas, and Coal, 1992 – 2012

Sources: Statistics Canada, U.S. Census Bureau

Exports from Sector 21 represented over 55 percent of Saskatchewan international exports, including C$12.6 billion (38.5 percent of total export value) from Sub-Sector 211 (Oil and Gas Extraction) and C$5.8 billion (17.7 percent) from Sub-Sector 21239 (Other Non-Metallic Mineral Mining and Quarrying; i.e., Potash). Over time, the value of Saskatchewan exports of oil and gas followed a pattern that is generally comparable to that observed in Alberta, albeit on a much smaller scale (Figure 16).

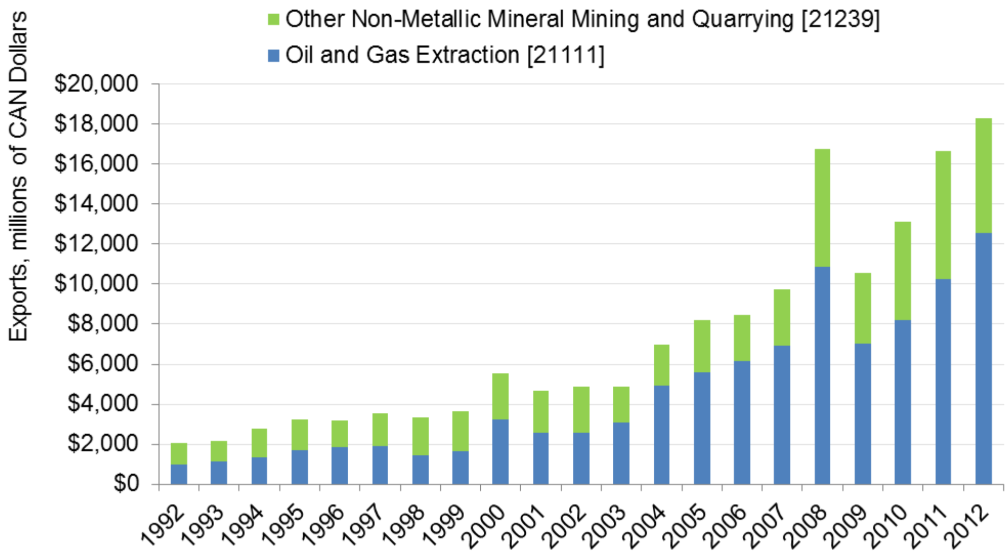

Figure 16: Saskatchewan Exports of Oil, Gas, and Minerals, 1992 – 2012

Sources: Statistics Canada, U.S. Census Bureau

In 2012, 100 percent of Saskatchewan's international exports of oil and gas (NAICS Sector 211) were destined to the United States; and so were 99.2 percent of Alberta's exports. The balance of Alberta's exports was shipped to China (0.7 percent), and a handful of other countries (WISERTrade 2013).

Figure 17 illustrates recent trends in the international exports of oil and gas and mineral and ores from Montana. Oil and gas exports increased steadily between 2001 and 2007, but declined sharply in 2008, and have remained below the $50 million mark ever since (WISERTrade 2013). Exports of minerals and ores experienced tremendous growth between 2006 and 2008, and again after 2009. In 2012, at $261 million, the sub-sector accounted for 10.5 percent of total State exports; and Minerals and Ores were the third largest source of export revenue for the State, behind Bulk Wheat ($915 million) and Chemicals ($327 million).

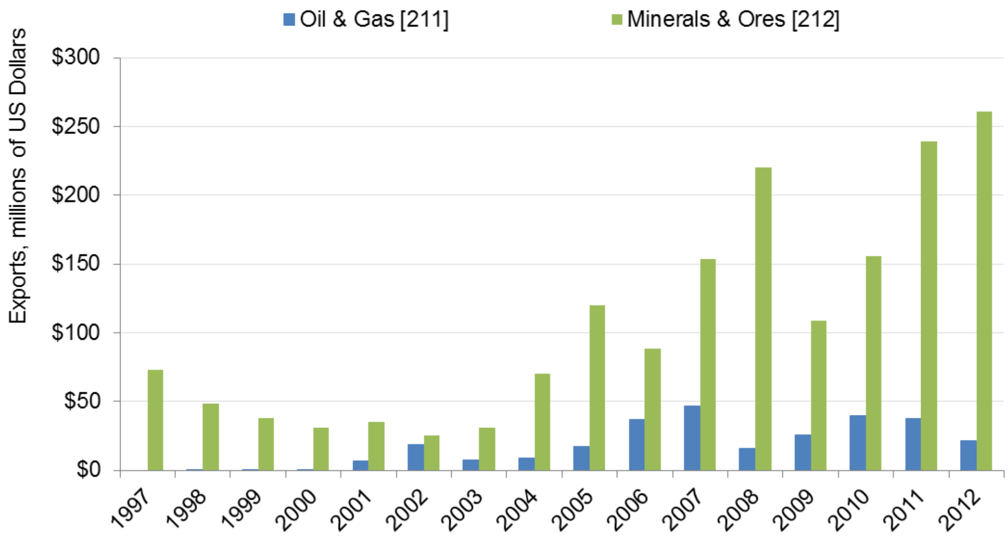

Figure 17: Montana Exports of Oil, Gas, Minerals and Ores, 1997 – 2012

Source: WISERTrade

3.1.4 Major Projects and Industry Outlook

Tables 12 and 13 provide an overview of major investment projects in the Mining, Quarrying and Oil and Gas Extraction sector, in Alberta and Saskatchewan, respectively. Additional information on major projects in the two provinces can be found in Appendix B.

Table 12: Inventory of Major Projects in Alberta

Sub-Sector	Number of Projects				
	Announced	Nearing Completion	Proposed	Under Construction	Grand Total
Mining			2		**2**
Conventional Oil & Gas	2	2	9	2	**15**
Oil Sands	7		40	18	**65**
Sub-Sector	**Value of Projects (C$ million)**				
	Announced	**Nearing Completion**	**Proposed**	**Under Construction**	**Grand Total**
Mining			$470		**$470**
Conventional Oil & Gas	$45	$430	$590	$625	**$1,690**
Oil Sands	$4,592		$68,590	$38,673	**$111,855**

Source: Alberta Enterprise and Advanced Education (2013)

Table 13: Inventory of Major Projects in Saskatchewan

Sub-Sector	Number of Projects	Average Project Value	Value of Projects (C$ million)
Mining	15	$2,172.2	**$32,583**
Oil & Gas and Pipeline	20	$258.4	**$5,169**

Source: Government of Saskatchewan (2013)

Over C$38 billion worth of investment projects in oil sands were under construction in Alberta in 2013, and an additional C$68.6 billion had been proposed. As in Phase 1 of the study, however, it is important to keep in mind that these projects are highly dependent on current and future expected oil, labor and material prices. A study conducted by the Canadian Energy Research Institute estimated that a world price of $70 per barrel was required to ensure the financial viability of these projects. Other analysts estimated this price to be anywhere between $75 and $100 a barrel.

According to the latest outlook of the Energy Information Administration (EIA), the world price of oil is expected to average $97 per barrel over the next three years (Figure 18)[14]. Even under a more "pessimistic", low-price scenario, the average world price would remain over the $70 threshold ($84.7 in 2014; $78.7 in 2015 and $73.7 in 2016).

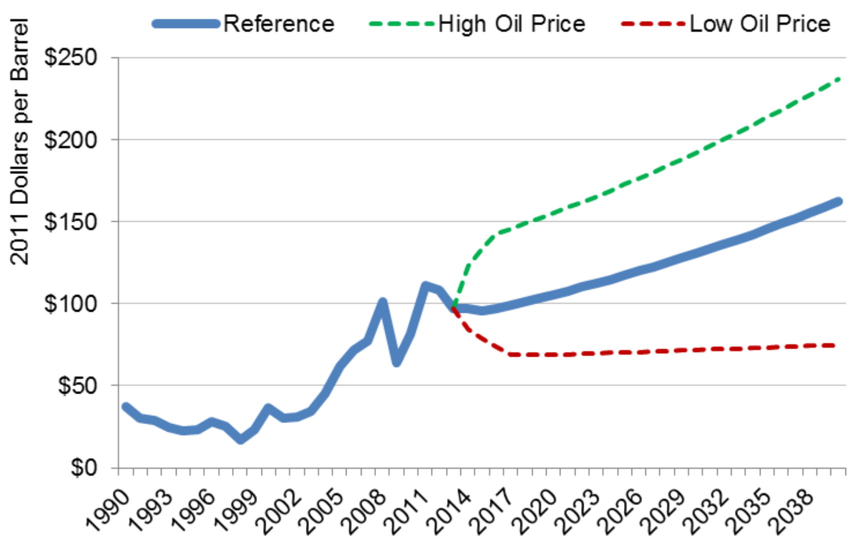

Figure 18: Brent Crude Oil Spot Prices in Three Scenarios, 1990 – 2040

Source: EIA 2013

Another industry concern has been in relation to pipeline capacity and the ability of Canadian producers to bring their oil to markets. Because of capacity constraints between Canada and refineries in the U.S., producers in Alberta have been forced to take steep price discounts on the sales price of their crude, relative to international benchmarks (e.g., Brent). As noted in TD Economics (2013a), however, price discounting of Canadian crude oil has eased in recent months, reflecting efforts by producers to ease transportation bottlenecks. Even without completion of the Keystone XL pipeline project, capacity constraints are expected to subside within the next few years, as other projects and initiatives are moving forward.

[14] The figure includes EIA's Reference case as well as EIA's High Oil Price and Low Oil Price scenarios. Per EIA, high prices would result from a combination of higher demand for petroleum and other liquids in the non-OECD nations and lower global supply. Low prices would result from a combination of lower demand and higher supply.

Overall, Alberta's capital expenditures in oil sands – and conventional oil and gas – are expected to remain steady, with average annual spending in excess of C$40 billion over the next decade (Energy Resources Conservation Board 2013). Total production of oil is expected to increase by about 10 percent in volume in 2013, 8 percent in 2014 and 6 percent in 2015 (TD Economics 2013b). In Alberta's natural gas industry, on the other hand, conditions are expected to remain difficult, owing to increased competition from the U.S. and downward pressures on international prices. Production of other energy sources and coal in particular, are expected to remain relatively flat, as illustrated in Figure 19. According to Alberta's Energy Resources Conservation Board, total coal output from the province would grow at an average annual rate of 0.7 percent between 2012 and 2022.

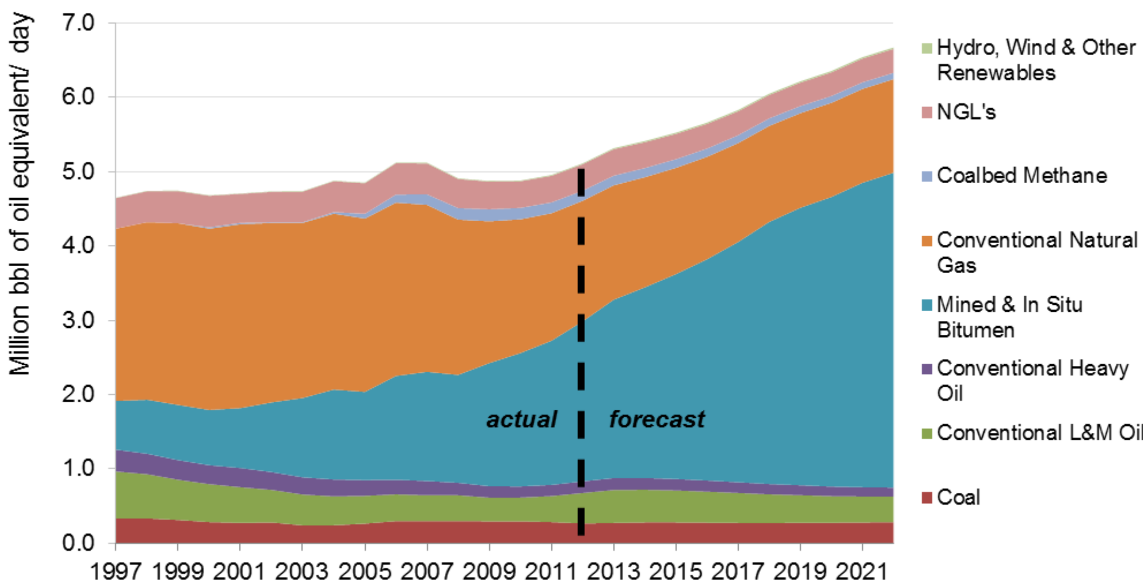

Figure 19: Forecast of Primary Energy Production in Alberta, 1997 – 2022

Source: Energy Resources Conservation Board (2013)

In Saskatchewan, crude oil production grew rapidly in 2012 (+10 percent), and is expected to continue to grow in 2013 (+8 percent), and beyond – as long as oil prices remain high.

Large investment projects are foreseen or underway in the mining sector, in particular for potash and uranium mining (Appendix B). Recent uncertainty in the potash sector (after a major overseas producer announced its intention to sharply increase production) led to reductions in prices and output in the Province; but industry analysts expect these effects to subside in 2014 (TD Economics 2013b). Along with improved prospects for potash, increases in uranium production are expected due to the opening of the Cigar Lake Mine, the world's second largest deposit of high-grade uranium (TD Economics 2013b). Recent trade agreements with China and India (where significant growth in nuclear energy is anticipated) should further stimulate the industry.

In Montana, the outlook for mining and oil and gas extraction is mixed. The production of coal remained relatively flat in recent years (at 35 to 40 million tons), and is not expected to increase in the short term – in particular because one of the major Montana mines recently announced reduced output and likely layoffs (Johnson 2013). In the long term, uncertainty prevails, as reduced demand from utilities increasingly turning to natural gas may or may not be offset by increased demand in overseas markets (e.g., China and India).

Oil production grew in 2012 (+9.5 percent) in the Eastern part of the State, with the development of the oil-bearing Bakken formation (Figure 20). But overall growth in output over the past decade has been somewhat lower than expected given investors' preference for thicker sections of the formation located in North Dakota. In 2012, with 25 million barrels a month, oil production in North Dakota remained about 10 times larger than in Montana. Figure 20 also helps put recent changes in oil production into perspective. Montana production fell continuously between 2006 and 2011, and last year's output was still below the average production levels observed in the 1970s and 1980s.

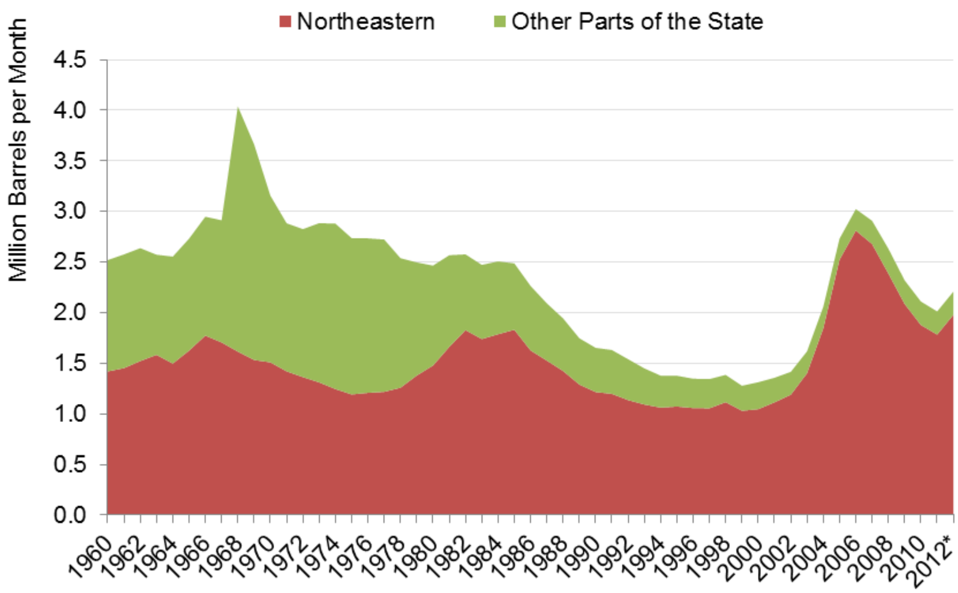

Figure 20: Monthly Oil Production in Montana, 1960 – 2012

Sources: Montana Department of Environmental Quality (2012) and Bakken Business Journal (2013)
*Note: * Preliminary (production in other parts of the State assumed equal to previous year)*

In a recent study on the potential impacts of oil development in the Bakken Region, MDT considered four oil production scenarios: High, Medium High, Medium Low, and Declining. Under the High scenario, production in Montana would reach 4.8 million barrels a month in 2025; under the Declining scenario, 2025 output levels would be about 1.5 million barrels a month (MDT 2013f).

The increase in oil production in the Bakken Region has led to rapid population growth in Eastern Montana, particularly in Richland County (+15.1% between April 2010 and July 2013), Sheridan County (+8.4%), and Roosevelt County (+6.7%)[15]. A number of small towns have been transformed into "*bedroom communities*" for workers employed across the state line, in North Dakota (Oldham 2013). In Sidney, for example, population grew by nearly a fifth (+19.4%) between April 2010 and July 2013. The populations of Culbertson, Bainville and Fairview also grew rapidly. Growth in these communities has created a number of challenges (including higher housing costs and strains on public infrastructure and services) and opportunities, in particular for residential development and related activities. Large increases in traffic in and around these communities have also been reported (Oldham 2013, MDT 2013f).

While oil production is generally expected to grow, the outlook for natural gas is a lot dimmer. Industry representatives interviewed for the study (Appendix A) did not expect any major growth in the production of natural gas in Montana, due to increased competition from other states and low or falling prices. Production of natural gas fell in 2012 (by about 15 percent) for the fifth consecutive year.

Overall, employment in Montana's Mining and Oil and Gas Extraction sector is expected to grow at 1.3 percent annually between 2010 and 2020 (Swanson 2012).

3.2 Agriculture

This section provides an overview of Sector 11 of the North American Industry Classification System (NAICS), as defined in the textbox below.

NAICS 11 - Agriculture, Forestry, Fishing and Hunting

This sector comprises establishments primarily engaged in growing crops, raising animals, harvesting timber, harvesting fish and other animals from their natural habitats and providing related support activities. Establishments primarily engaged in agricultural research or that supply veterinary services are not included in this sector.

Source: Statistics Canada, http://stds.statcan.gc.ca/naics-scian/2007/cs-rc-eng.asp?criteria=11

3.2.1 Employment

In 2012, the Agriculture, Forestry, Fishing and Hunting sector represented about 1.4 percent of Alberta's economy and employed 2.8 percent of its workers. In Saskatchewan, the sector contributed to 6.4 percent of the province's GDP and 7.5 percent of total employment. In Montana, these estimates were 2.9 percent (of Gross State Product) and 1.1 percent, respectively. In both Canadian provinces, employment in the sector was lower in 2012 than it was ten years ago (Figure 21). In Montana, on the other hand, Sector 11 employment, although significantly lower, increased during the period (at an average annual rate of 1.1 percent).

[15] Compared to +2.6% in Montana overall, during the same period (U.S. Census Bureau 2014)

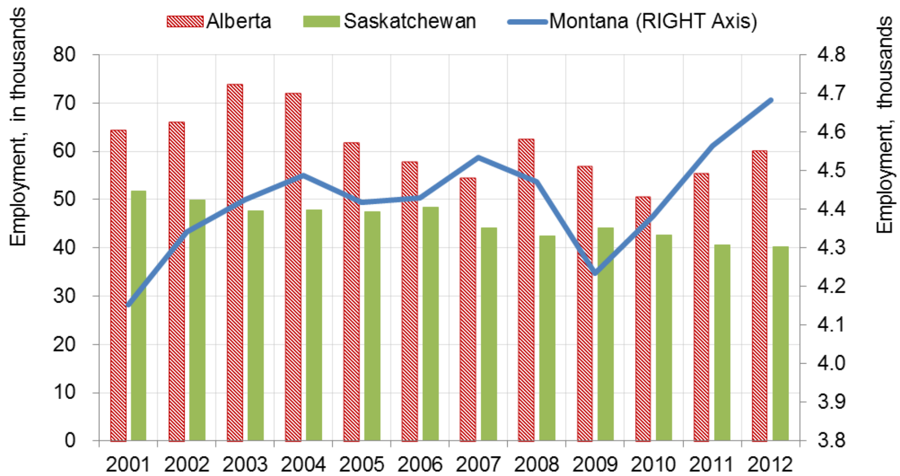

Figure 21: Employment in the Agriculture, Forestry, Fishing and Hunting Sector, 2001 – 2012

Source: Bureau of Labor Statistics QCEW, Statistics Canada LFS

A breakdown of Sector 11 employment by sub-sector can be found in Figure 22, from 2001 to 2012, in Montana.

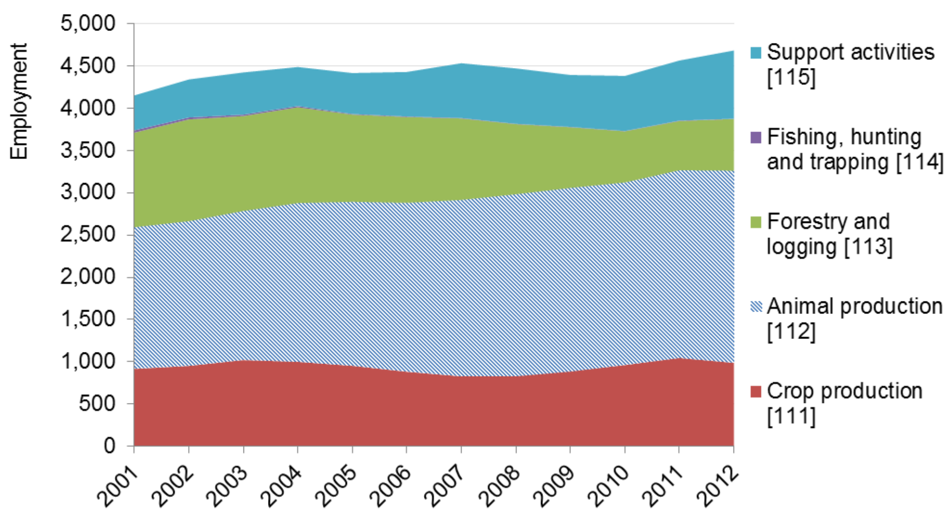

Figure 22: Employment in the Agriculture, Forestry, Fishing and Hunting Sector by Sub-Sector in Montana, 2001 – 2012

Source: Bureau of Labor Statistics QCEW

In 2012, Animal Production represented about half of total employment in the sector. Over the period, it was also the second fastest growing sub-sector, behind Support Activities (which includes Soil Preparation, Postharvest Crop Activities and Farm Management Services). Employment in Forestry and Logging (113) and Fishing, Hunting and Trapping (114) declined steadily between 2001 and 2012. Employment in Crop Production (111), on the other hand, remained more or less constant.

3.2.2 Earnings and Value Added

In the last decade or so, average weekly earnings of those employed in the Agriculture, Forestry, Fishing and Hunting sector were relatively steady, growing (annually, in nominal terms) by 2.7 percent in Alberta, 1.7 percent in Saskatchewan and 3.8 percent in Montana (Figure 23).

Average Sector 11 earnings in Montana were lower than in its northern neighbors (even after accounting for purchasing power differences between the U.S. and Canadian dollars); and significantly lower than the national U.S. average (across all sectors the economy).

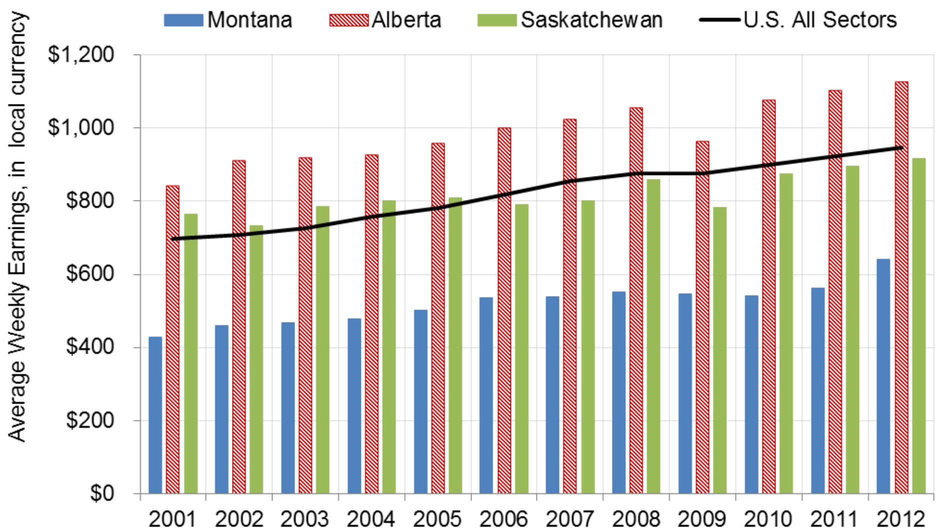

Figure 23: Average Weekly Earnings in the Agriculture, Forestry, Fishing and Hunting Sector, 2001 – 2012

Source: Bureau of Labor Statistics QCEW, Statistics Canada LFS

Between 1998 and 2012, total value added in the sector decreased in real terms in both Canadian provinces (-3.2 percent on average annually in Alberta; -3.5 percent in Saskatchewan) and increased at a modest 2.1 percent yearly in Montana (Figure 24).

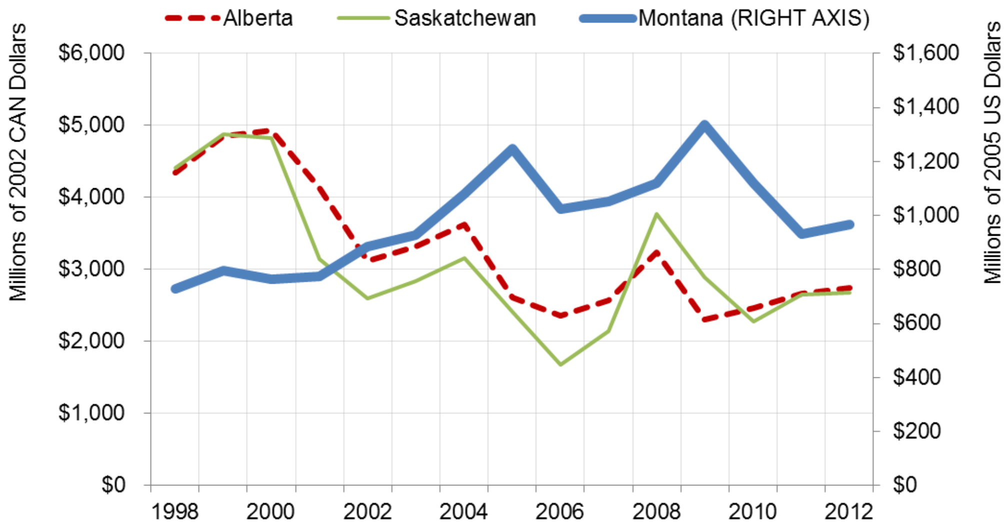

Figure 24: Total Value Added in the Agriculture, Forestry, Fishing and Hunting Sector, 1998 – 2012

Source: Bureau of Labor Statistics, Statistics Canada

3.2.3 International Trade

In 2012, Montana exported over $1.0 billion worth of agricultural products, including $915 million in bulk grains, $107 million in crop products other than bulk grains, and $65 million in livestock and livestock products (Figure 25). This represented over 40 percent of the State's total export revenue. As with energy products, most of the fluctuations in total export *value* shown in Figure 25 are explained by changes in commodity prices. Thus, the average price received by Montana's farmer for a bushel of wheat fell by 24 percent between 2008 and 2009. It increased by 21.4 percent and 22.1 percent in 2010 and 2011, respectively, and by a (relatively) modest 6.1 percent in 2012 (USDA 2013). Canada was the main recipient of Montana's exports other than bulk grain, with 43 percent of total exports. It was followed by India (13 percent), Russia (10 percent), Japan (8 percent) and Mexico (6 percent) (WISERTrade 2013).

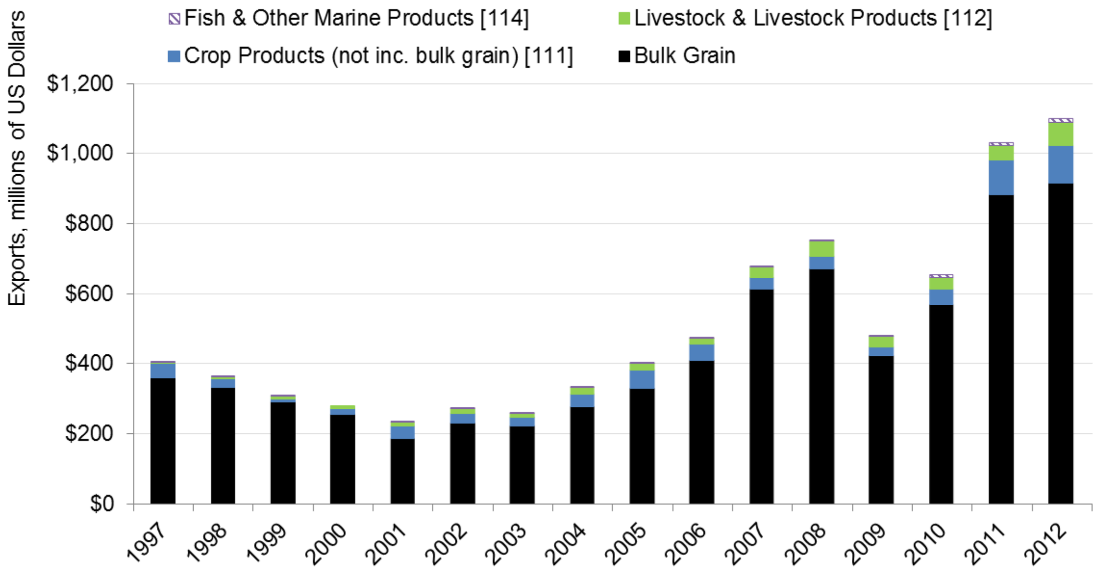

Figure 25: Montana Exports of Agricultural Products, 1997 – 2012

Sources: WISERTrade, U.S. Department of Agriculture

In 2012, the State shipped (primarily by rail) 117.2 million bushels of wheat to exporting facilities in the U.S. According to the Montana Wheat and Barley Committee, Japan purchased over 50 percent of Montana's wheat, with other destinations including Taiwan, South Korea, the Philippines and Indonesia. About 75 percent of all Montana wheat was exported to Asia.

A significant portion of Montana's agricultural production is destined to the U.S. domestic market. Thus, domestic shipments of agricultural products originating in Montana (with an intermediate or final destination within the U.S.) reached nearly $8.0 billion in 2011 (FHWA FAF 3), including $5.4 billion in cereal grains, $2.3 billion in live animals and $0.4 billion in other agricultural products.

The value of Alberta's agricultural exports (primarily wheat, oilseeds and beef cattle) grew rapidly (Figure 26) between 2003 and 2008, as commodity prices were increasing. With the 2008 recession and collapse of commodity prices, Alberta's exports fell by over 20 percent a year in value between 2008 and 2010. They recovered rapidly in 2011 and 2012, to exceed their 2008 peak.

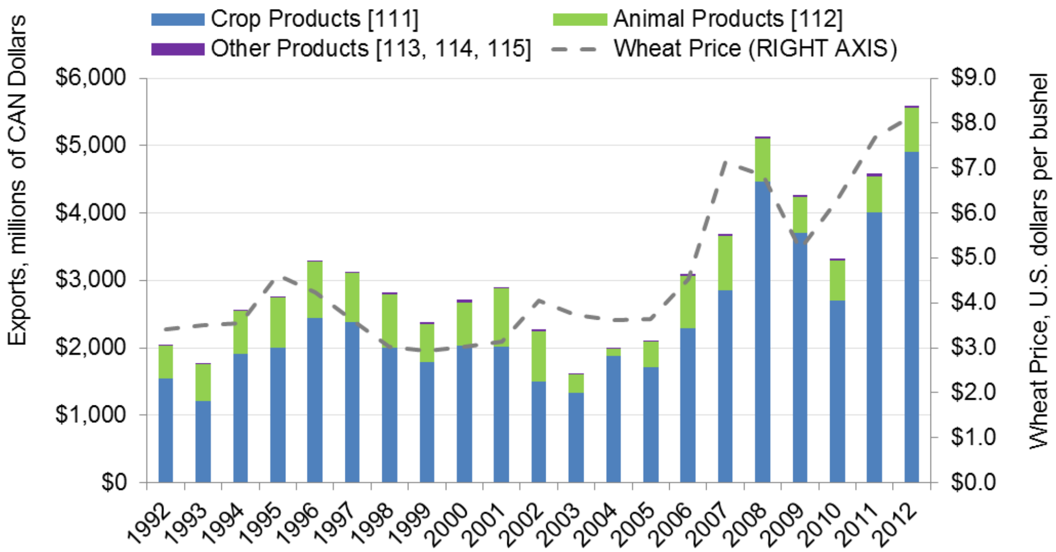

Figure 26: Alberta Exports of Agricultural Products, 1992 – 2012

Sources: Statistics Canada, U.S. Census Bureau

The United States is the main recipient of Alberta's agricultural products, with 24 percent of total exports in 2012. They were followed by Japan (16 percent), China (15 percent), and Mexico (9 percent) (WISERTrade 2013).

The value of Saskatchewan's agricultural exports (primarily wheat, oilseed, dry peas and beans and other grains) shows a pattern similar to Alberta's (Figure 27). The value of exports had been growing rapidly before the Great Recession; fell between 2008 and 2011 and recovered to their pre-recession level in 2012.

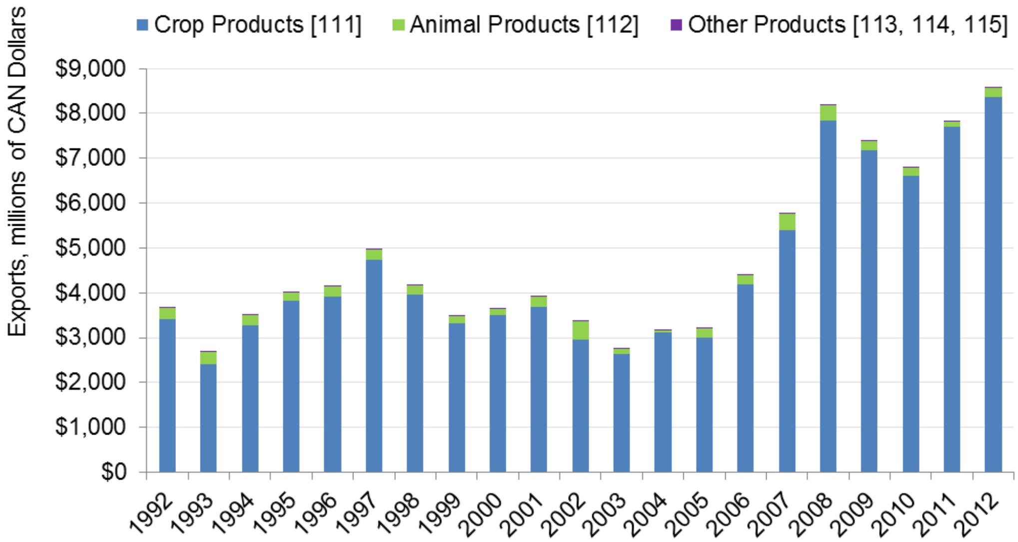

Figure 27: Saskatchewan Exports of Agricultural Products, 1992 – 2012

Sources: Statistics Canada, U.S. Census Bureau

Until 2012, the U.S. had been the largest destination of Saskatchewan's agricultural exports. In 2012, China overtook the U.S., with 25 percent of total export value. It was followed by the U.S. (23 percent), Japan (20 percent), Mexico (12 percent), and India (8 percent) (WISERTrade 2013).

3.2.4 Major Projects and Industry Outlook

Figure 28 illustrates changes in total capital expenditures (buildings and equipment) in agriculture in Alberta and Saskatchewan. The relative decline in investment spending (from about 6 percent of total capital expenditures in the mid-1990s to about 2 percent in 2012) reflects the increased focus of these economies on mining and oil and gas extraction.

As of the fall of 2013, a total of seven agriculture projects were listed in the Inventory of Major Projects prepared by Alberta Enterprise and Advanced Education. These included a proposed C$150 million fertilizer plant expansion in the municipality of Redwater; a C$50 million canola processing facility in Camrose County; a C$32 million bio-refinery in Lacombe; a C$30 million agrifood research center in Brooks; and a C$17 million upgrade to an existing beef slaughterhouse in Rocky View County. In Saskatchewan, about C$340 million worth of investment were proposed or underway, including a C$90 million agriculture and oil terminal in Northgate; the C$60 million expansion of an existing canola crushing plant in Yorkton, and a C$50 million pasta and pulse milling plant in Regina.

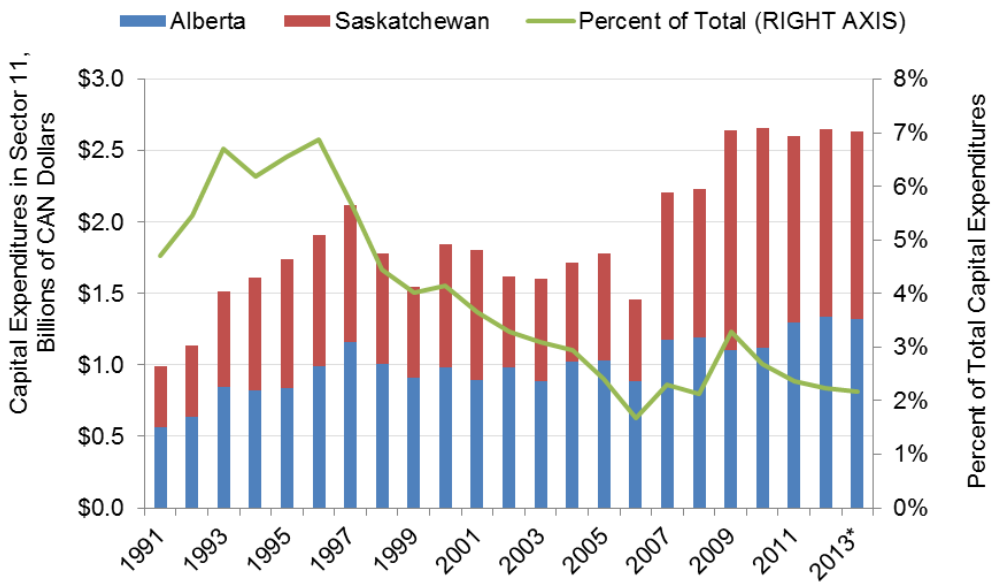

Figure 28: Total Capital Expenditures in Sector 11 in Alberta and Saskatchewan, 1991 – 2012 with Projections for 2013

Source: Statistics Canada

At C$305 million, the cumulative value of major agriculture projects in Alberta was, in the fall of 2013, significantly larger than in 2008 (C$89 million) or 2009 (C$73 million); but it was roughly in line with that reported in earlier years (C$331 in 2006; C$585 in 2005). The cumulative value of major projects in Saskatchewan was significantly larger than in previous years (2010 – 2012).

With respect to agriculture employment, Alberta Employment and Immigration (2013) foresees an increase of about 3.7 percent in 2013, followed by a small decline of 0.5 percent in 2014 and 2015; and larger declines of -1.0 percent and -1.1 percent in the following years. In an earlier Industry Employment Outlook, the agency had foreseen growth rates of 0.6 percent, 0.9 percent and 0.5 percent in 2013, 2014 and 2015, respectively. It is not clear what prompted the agency to revise its forecast.

In Montana, employment in agriculture is expected to grow at a modest annual rate of 0.5 percent between 2010 and 2020; a cumulative growth of 4.8 percent (Swanson 2012). Overall, the outlook for agriculture in the state is relatively strong. Crop prices are high by historical standards, and are expected to remain so – at least in the short run. And signs of recovery in the housing market suggest the possibility of resurgence in the demand for lumber and renewed growth in the forest products industry. Supply constraints (in relation to forest health and tree mortality, and availability of logging workforce), however, may limit growth prospects in that specific industry.

3.3 Construction

This section provides an overview of the construction sector in Montana, Alberta, and Saskatchewan. A formal definition of the sector is provided in the text box below.

NAICS 23 - Construction

This sector comprises establishments primarily engaged in constructing, repairing and renovating buildings and engineering works, and in subdividing and developing land. These establishments may operate on their own account or under contract to other establishments or property owners. They may produce complete projects or just parts of projects. Establishments often subcontract some or all of the work involved in a project, or work together in joint ventures. Establishments may produce new construction, or undertake repairs and renovations to existing structures.

Source: Statistics Canada, http://stds.statcan.gc.ca/naics-scian/2007/cs-rc-eng.asp?criteria=23

3.3.1 Employment

Construction is one of the largest economic sectors in the region. Although construction itself may not directly impact trade flows between Canada and the United States, the activities generated by a vibrant construction sector often stimulate the broader economy and may generate additional imports or exports of construction material, machinery or equipment. A robust construction sector also implies increases in local transportation needs.

In 2012, the construction sector accounted for 5.2 percent of GDP in Montana, 11.8 percent in Alberta and 7.9 percent in Saskatchewan. It employed 5.4 percent of the workers in Montana, 10.5 percent in Alberta and 8.3 percent in Saskatchewan.

In Montana, construction employment fell by over 30 percent between 2007 and 2010; was flat in 2011 and grew by only 1.7 percent in 2012. In 2012, employment in the sector remained 28 percent lower than its pre-recession peak (Figure 29).

In Alberta, construction employment only fell in 2009, by about 7 percent. It recovered rapidly in the subsequent years with annual growth rates of 5.4 percent, 2.1 percent and 7.5 percent in 2010, 2011 and 2012 respectively. In Saskatchewan, construction employment grew steadily throughout the period, at an average annual rate of 6.1 percent. In 2012 alone, construction employment grew by 11 percent.

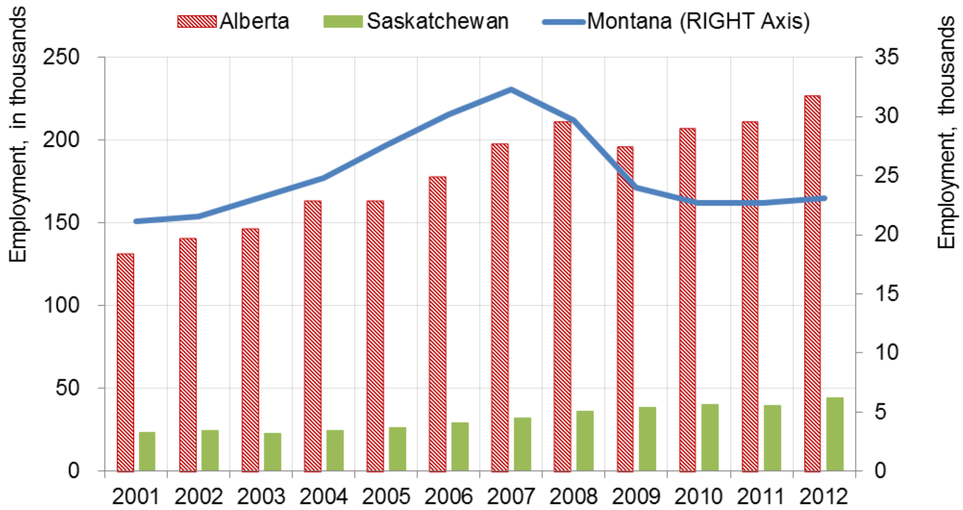

Figure 29: Employment in the Construction Sector, 2001 – 2012

Sources: Bureau of Labor Statistics QCEW, Statistics Canada LFS

Figure 30 illustrates how employment in three sub-sectors of the construction sector grew over time, in Montana. Construction of Buildings was the most severely impacted by the downturn (-43 percent in employment between 2007 and 2012), followed by Specialty Trade Contractors (-28 percent) and Heavy and Civil Engineering Construction (-7 percent).

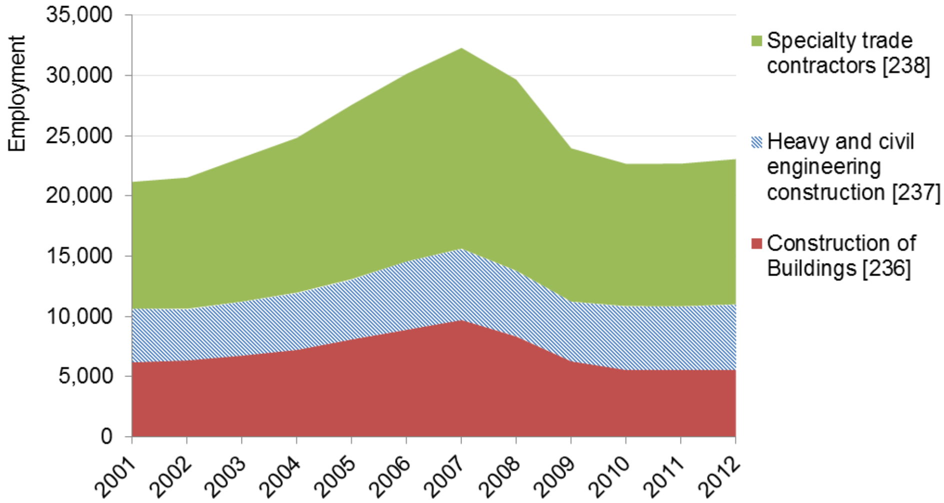

Figure 30: Employment in the Construction Sector by Sub-Sector in Montana, 2001 – 2012

Source: Bureau of Labor Statistics QCEW

3.3.2 Earnings and Value Added

In all three states/provinces, average weekly earnings in the construction sector grew rapidly between 2001 and 2007 (Figure 31), with an average annual growth rate of 5.2 percent in 2005, 4.0 percent in 2006 and 7.9 percent in 2007 (weighted average for the region, using state/provincial employment as weights). Between 2008 and 2012, average earnings grew at a much slower rate in Montana (+3.1 percent on average annually) than in Alberta (+4.3 percent) or Saskatchewan (+5.7 percent).

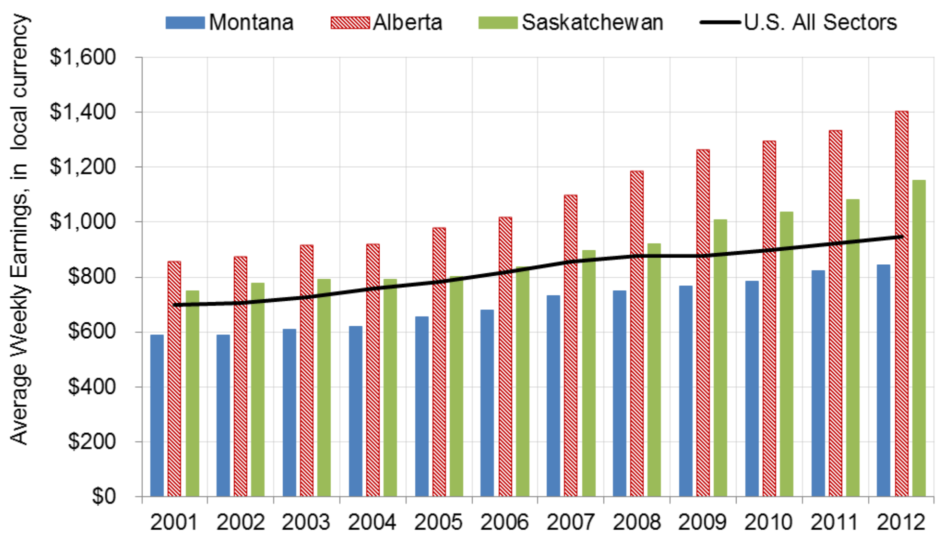

Figure 31: Average Weekly Earnings in the Construction Sector, 2001 – 2012

Sources: Bureau of Labor Statistics QCEW, Statistics Canada LFS

Changes in total value added in the construction sector are illustrated in Figure 32. They generally mirror the changes in employment shown in Figure 29. Between 2008 and 2012, while real GDP in construction declined by 7.5 percent (overall) in Montana; it increased by 40.7 percent in Alberta and by 39.1 percent in Saskatchewan.

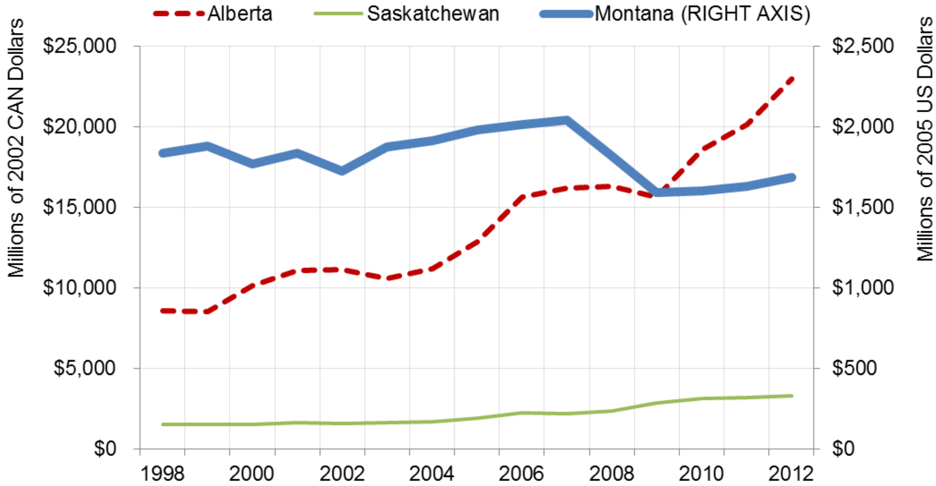

Figure 32: Total Value Added in the Construction Sector, 1998 – 2012

Sources: Bureau of Labor Statistics, Statistics Canada

3.3.3 Major Projects and Industry Outlook

Major residential and infrastructure construction projects, proposed or underway in Alberta and Saskatchewan, are summarized in Table 14. In both provinces, large infrastructure projects are dominated by capital investments in transportation (e.g., airport, highway, and light rail transit), water, and wastewater.

Table 14: Major Projects in the Construction Sector* in Alberta and Saskatchewan, 2013

Province and Sector	Number of Projects	Total Value of Projects in Millions of CAN Dollars	Average Project Value
ALBERTA			
Residential	120	$2,733	$22.8
Infrastructure	225	$11,844	$52.6
SASKATCHEWAN			
Residential	37	$1,743	$47.1
Infrastructure	76	$2,588	$34.0

** Residential construction and infrastructure*
Sources: Alberta Enterprise and Advanced Education (2013), Government of Saskatchewan (2013)

The total value of residential projects in Alberta is down considerably compared to the pre-recession peak of $6.8 billion (in 2008). In Saskatchewan, the latest estimated value of major residential projects is about 40 percent lower than the average for the preceding three years ($2.9 billion); and the value of major infrastructure projects is about 10 percent lower than the 2010 – 2012 average ($2.8 billion).

But construction activity and employment are influenced by a lot more than just residential and infrastructure projects. And mining and oil and gas development in both Canadian Provinces is expected to sustain growth in the sector. In Alberta, construction employment is expected to increase by 5.2 percent in 2013; and at an average annual rate of 1.8 percent between 2013 and 2017 (Alberta Employment and Immigration 2013).

Growth in Montana's construction industry is expected to accelerate, in particular heavy construction in Billings and the eastern counties in relation to energy development (Barkey 2013). Over the long term, through 2020, construction employment in Montana is expected to increase at a healthy average annual rate of 2.8 percent (Swanson 2012).

3.4 Manufacturing

This section provides an overview of recent developments in the manufacturing sector, as defined in the textbox below.

NAICS 31-33 - Manufacturing

This sector comprises establishments primarily engaged in the physical or chemical transformation of materials or substances into new products. These products may be finished, in the sense that they are ready to be used or consumed, or semi-finished, in the sense of becoming a raw material for an establishment to use in further manufacturing. Related activities, such as the assembly of the component parts of manufactured goods; the blending of materials; and the finishing of manufactured products by dyeing, heat-treating, plating and similar operations are also treated as manufacturing activities. Manufacturing establishments are known by a variety of trade designations, such as plants, factories or mills.

Source: Statistics Canada, http://stds.statcan.gc.ca/naics-scian/2007/cs-rc-eng.asp?criteria=31-33

3.4.1 Employment

Employment in the manufacturing sector experienced a sharp decline between 2008 and 2009, and a relatively weak recovery after 2010 (Figure 33). In 2012, the sector accounted for 4.1 percent of total employment in Montana, 6.4 percent in Alberta and 5.1 percent in Saskatchewan.

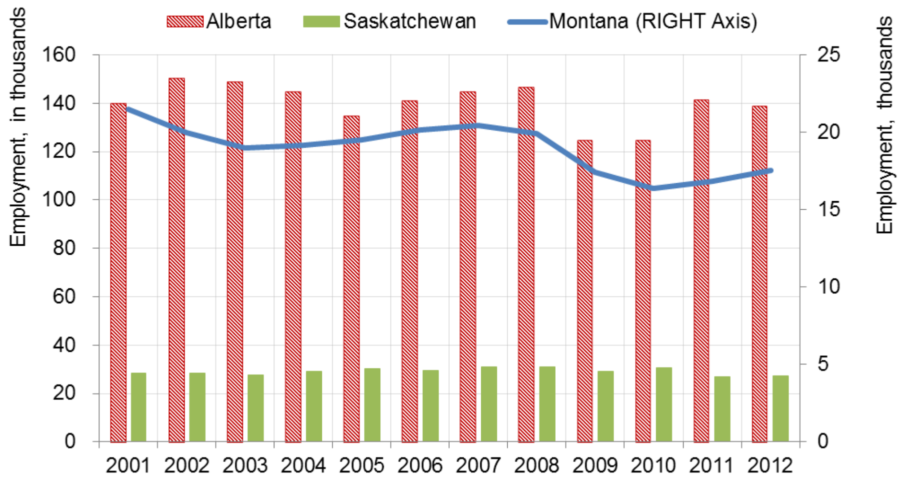

Figure 33: Employment in the Manufacturing Sector, 2001 – 2012

Sources: Bureau of Labor Statistics QCEW, Statistics Canada LFS

Manufacturing employment in Montana fell by 3 percent in 2008, 13 percent in 2009 and 6 percent in 2010. Despite a partial recovery in 2011 and 2012 (+2.8 percent and +4.0 percent, respectively), the sector employed about 3,000 fewer workers in 2012 than it did in 2007.

In 2012, about half of all manufacturing employment in Montana was in one of the following four sub-sectors: Wood Products (15 percent of total manufacturing employment), Food and Kindred Products (14 percent), Fabricated Metal Products (12 percent) or Miscellaneous Products (9 percent). The largest employment losses – between 2008 and 2012 – were also experienced in the Wood Products sub-sector (-34 percent). In more recent years, recovery was the strongest for Nonmetallic Mineral Products (+52 percent between 2010 and 2012) and Fabricated Metal Products (+37 percent). These variations are illustrated in Figure 34.

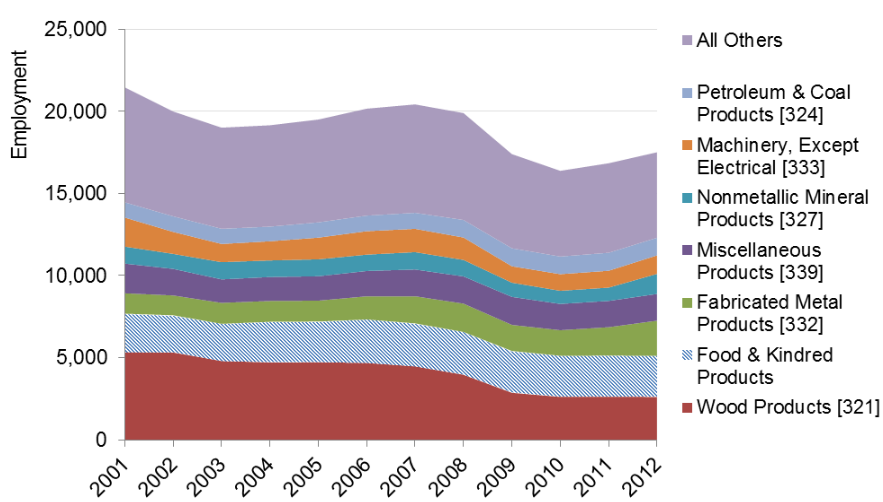

Figure 34: Employment in the Manufacturing Sector by Sub-Sector in Montana, 2001 – 2012

Source: Bureau of Labor Statistics QCEW

A generally similar pattern was observed in Alberta, where manufacturing employment experienced a strong decline between 2008 and 2009 (-15 percent), before a period of partial recovery. As a result, about 10,000 fewer workers were employed in manufacturing in 2012 than in 2008. In Saskatchewan, manufacturing employment declined overall between 2001 and 2012. Losses were particularly large in 2009 (-6.4 percent) and 2011 (-11.1 percent). Recovery was brief (+4.8 percent in 2010) and/or very weak (+0.4 percent in 2012). In 2012, with 27,200 employees, manufacturing employment in the Province was about 4,000 lower than it was four years earlier.

3.4.2 Earnings and Value Added

Between 2001 and 2012, average weekly earnings in manufacturing grew at an average annual rate of 2.6 percent in Montana, 3.5 percent in Alberta and 2.8 percent in Saskatchewan (Figure 35). Weekly earnings fell in nominal terms in Alberta in 2009 (-3.7 percent). Overall, earnings in the sector were in pace with general inflation and remained generally close to the U.S. economy-wide average.

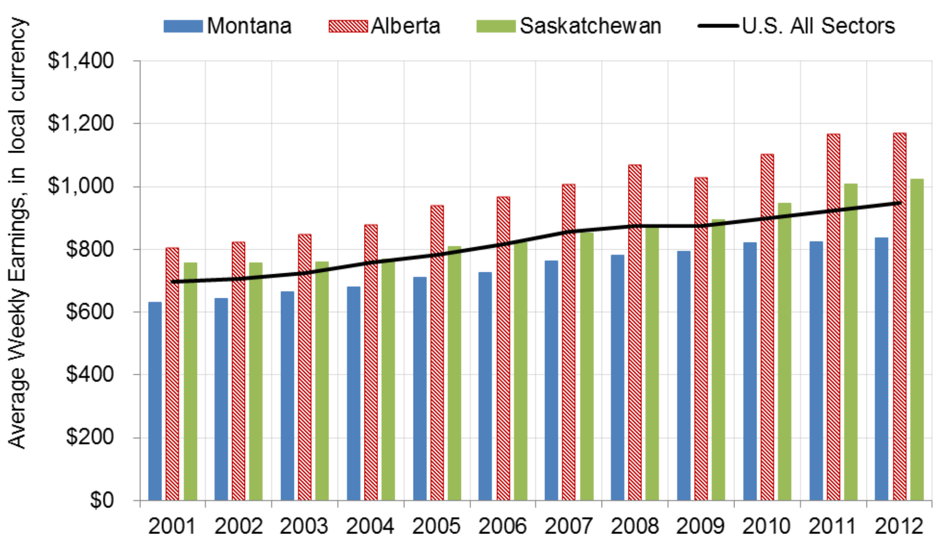

Figure 35: Average Weekly Earnings in the Manufacturing Sector, 2001 – 2012

Sources: Bureau of Labor Statistics QCEW, Statistics Canada LFS

Figure 36 illustrates the fluctuations in total value added in the manufacturing sector. Despite employment losses in both provinces, real GDP grew at an average annual rate of 6.1 percent in Alberta and 3.9 percent in Saskatchewan between 2008 and 2012. Montana's manufacturing product in 2012, on the other hand, had yet to recover for the effects of the Great Recession.

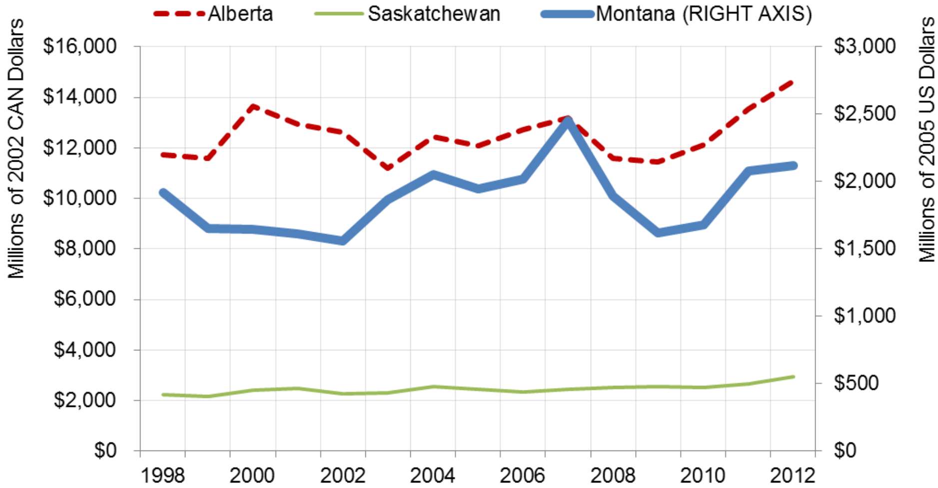

Figure 36: Total Value Added in the Manufacturing Sector, 1998 – 2012

Sources: Bureau of Labor Statistics, Statistics Canada

3.4.3 International Trade

In 2012, manufactured products represented about 45 percent of the total value of exports from Montana; and 25 percent and 17 percent of the total value of exports from Alberta and Saskatchewan, respectively. At the same time, 89 percent of the total value of imports into Alberta and 91 percent of the total value of imports into Saskatchewan were from the manufacturing sector (Statistics Canada, U.S. Census Bureau). Exports of manufactured commodities from Montana grew rapidly (in value) between 2003 and 2008. They fell in 2009, but recovered in the following year, to stabilize around $1.2 billion in 2011 – 2012 (Figure 37).

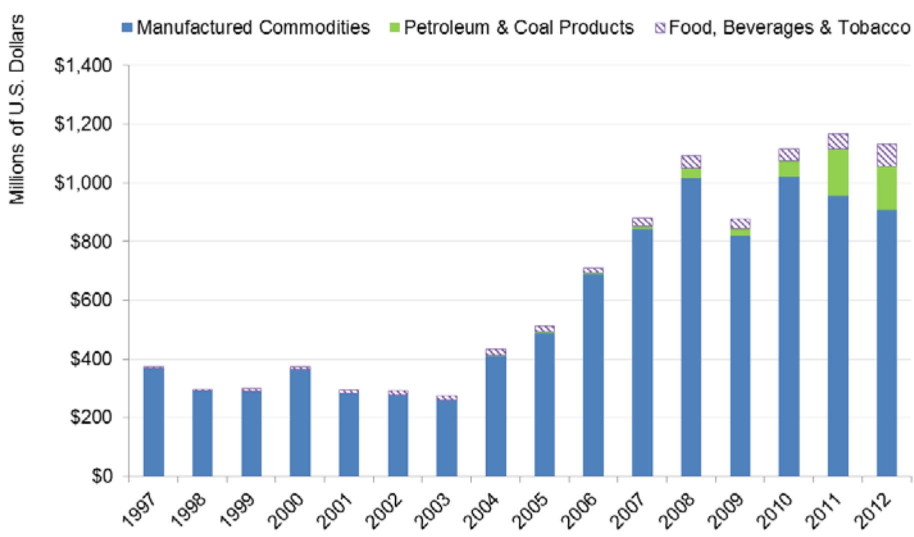

Figure 37: Montana Exports of Manufactured Products, 1997 – 2012

Source: WISERTrade

In 2012, Chemical Products represented about 30 percent of total exports from Montana's manufacturing sector (in value). Machinery, Petroleum and Coal Products, and Transportation Equipment came next, with 19 percent, 13 percent and 9 percent, respectively (Figure 38).

Between 2002 and 2012, among the 10 most exported products shown in Figure 38, those that grew the fastest were Petroleum and Coal Products (+61 percent overall); Transportation Equipment (+28 percent) and Chemicals (+19 percent). Just under half of these exports were shipped to Canada ($537 million); and about a quarter went to China, Belgium, Taiwan and South Korea (WISERTrade 2013).

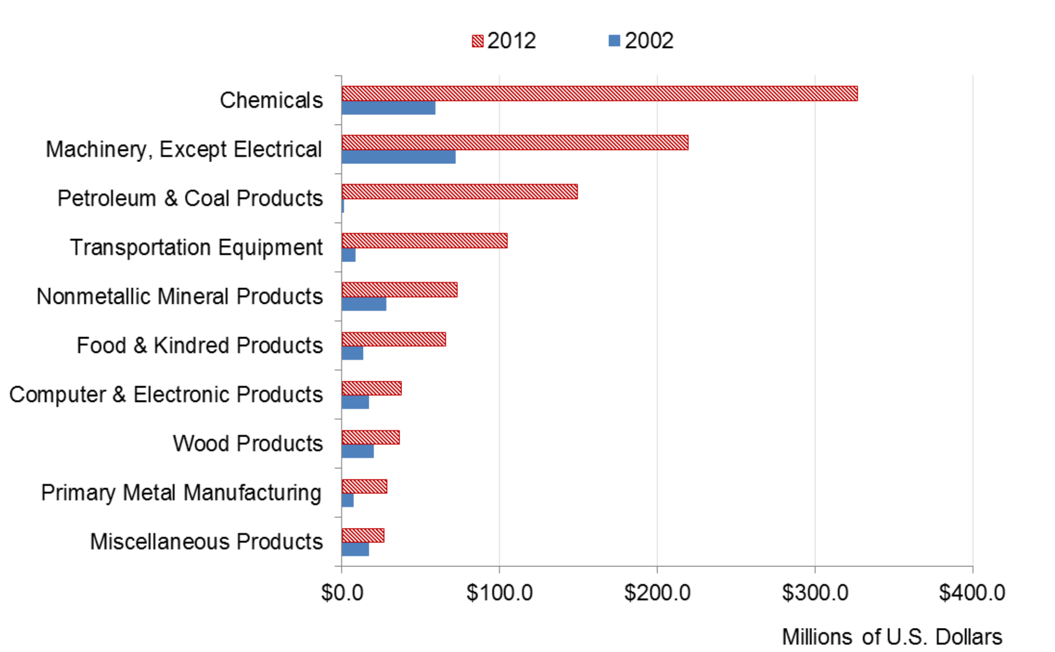

Figure 38: Top 10 Manufactured Products Exported from Montana, 2002 and 2012

Source: WISERTrade

Alberta's exports of manufactured products followed a comparable trend to that observed in Montana. Exports grew rapidly between 2003 and 2008, reached a peak in 2008 (of about C$26.3 billion), dropped significantly in 2009, and recovered – but only partially – after that (Figure 39).

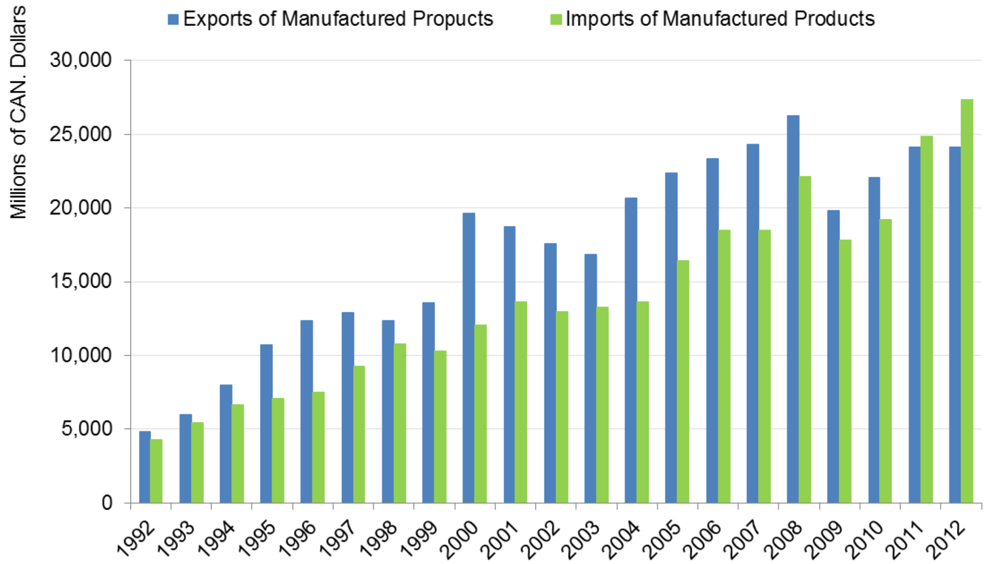

Figure 39: Alberta Imports and Exports of Manufactured Products, 1992 – 2012

Sources: Statistics Canada, U.S. Census Bureau

In 2012, Alberta's exports originated primarily from the following sub-sectors: Chemical Manufacturing (29 percent), Petroleum and Coal Products Manufacturing (16 percent), Machinery Manufacturing (15 percent), and Food Manufacturing (14 percent). About two thirds of manufacturing exports were shipped to the United States. The majority of these exports were shipped to the U.S.; with China, Japan and Mexico accounting for 28 percent, 10 percent and 6 percent of the balance, respectively (Statistics Canada, U.S. Census Bureau).

Figure 39 also illustrates the rapid increase in the value of imports of manufactured products into the Province. In 2011, for the first time in 20 years, Alberta imported more manufactured products than it exported (comparison in value). Machinery was the most imported commodity in 2012, with over 17 percent of the total. About 63 percent of imports originated in the United States, with China and Mexico coming next (at 11 percent and 6 percent, respectively).

Changes in the value of exports and imports of manufactured products from/to Saskatchewan are illustrated in Figure 40. The Province, a net importer of manufactured commodities since 1992, has seen the value of its imports more than quintuple between 1992 and 2012. This growth was fueled in large part by the demand for Machinery, which accounted for nearly 40 percent of the total value of provincial manufacturing imports in 2012. The second most imported commodity was Transportation Equipment (15 percent), followed by Chemicals (12 percent). Over 85 percent of Saskatchewan's imports of manufactured products originated in the United States. Mexico was a distant second, with 2.4 percent of total import value.

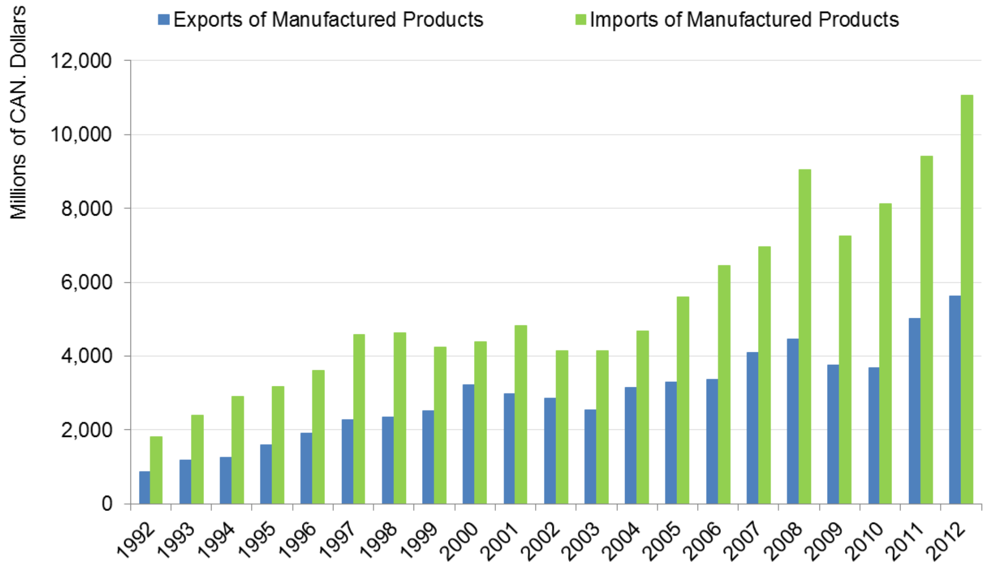

Figure 40: Saskatchewan Imports and Exports of Manufactured Products, 1992 – 2012

Sources: Statistics Canada, U.S. Census Bureau

Products from the Food Manufacturing sub-sector were, by far, the most exported commodities (46 percent of total value), followed by Chemicals (16 percent). Primary destinations for Saskatchewan's exports were the United States (69 percent of total value), China (11 percent) and the United Kingdom (10 percent).

3.4.4 Major Projects and Industry Outlook

Total capital expenditures (buildings and equipment) in the manufacturing sector of Alberta's economy fluctuated between $1.0 and $3.0 billion a year during 1991 – 2012 (Figure 41). In Saskatchewan, capital investment in manufacturing only grew nominally in recent years, after 2009. For both provinces combined, the share of the manufacturing sector in total capital expenditures fell from about 7 percent in the late 1990s to only 3 percent last year.

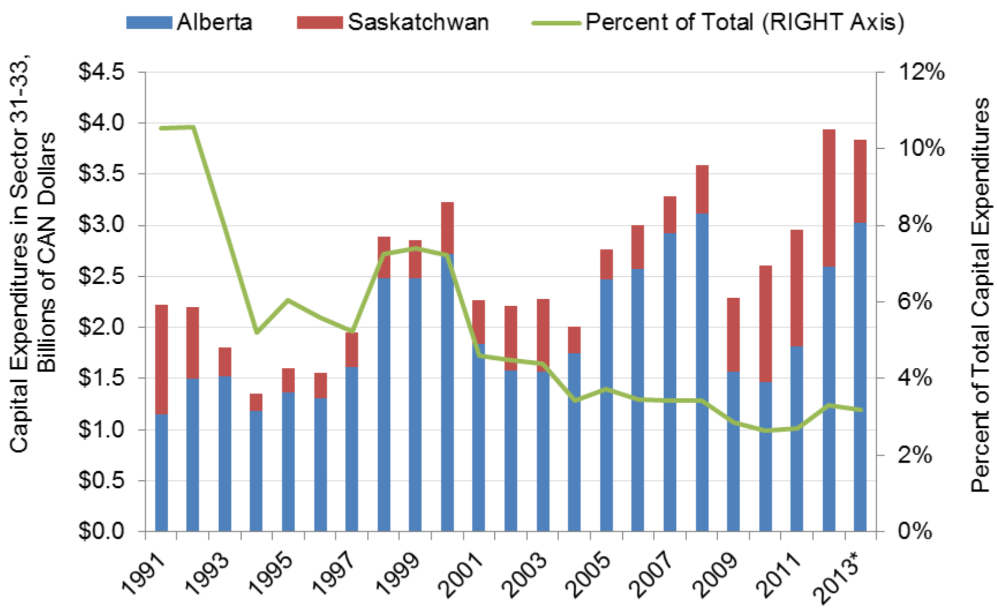

Figure 41: Total Capital Expenditures in the Manufacturing Sector in Alberta and Saskatchewan, 1991 – 2012 with Projections for 2013

Source: Statistics Canada

The latest Inventory of Major Projects prepared by Alberta Enterprise and Advanced Education only identifies a couple of projects in Manufacturing, with a combined value of C$54.5 million. The total value of projects currently proposed or underway in Saskatchewan is about C$3.2 billion, for a total of six projects (including a C$2.0 billion New Nitrogen Fertilizer Plant in Belle Plaine, a C$590 million Mine and Processing Facility in the Rural Municipality of Corman Park, and a C$225 million Mineral Processing Facility in Wynyard).

In Alberta, total manufacturing employment is expected to fall by 1.8 percent in 2013, remain flat in 2014 and 2015 (+0.2 percent and 0.0 percent, respectively), and fall again in 2016 and 2017. The largest relative declines are expected in the following industries: Motor Vehicle, Body, Trailer and Parts Manufacturing (-11.9 percent in 2013), Other Transportation Equipment Manufacturing (-7.1 percent), and Wood Products and Paper Manufacturing (-5.5 percent and -4.2 percent, respectively). Relatively healthy growth is expected in the very short term (2013 and 2014) for: Food and Beverage Products, Metal Fabrication and Machinery, and Computer, Electronic and Electrical Products (Alberta Employment and Immigration 2013).

It appears that – at least in the short run – the expanding oil and gas industry and broader economy of the two Canadian Provinces would continue to fuel the importation of manufactured products (from the United States and other countries) as opposed to the expansion of domestic manufacturing capability. A few sub-sectors are expected to remain strong in the coming years (including Food and Beverage, and Petrochemical manufacturing), but longer-term trends may negatively affect these as well (e.g., shift in focus to organic food, in the wake of increasing health awareness).

In Montana, after the uptick in manufacturing employment and output of 2011 and 2012, the outlook is for continued improvements in 2013 with expectations of employment growth and increased earnings (Morgan et al. 2013). This is explained primarily but upward trends in the national and Canadian economies, as well as continued oil and gas development in the region. "Re-shoring", the return of jobs to the U.S. from overseas locations, may also contribute to the rebirth of manufacturing in the state.

In its 2012 survey of Montana manufacturers, the Bureau of Business and Economic Research at the University of Montana found that 42 percent of respondents expected better conditions during 2013 (versus 14 percent expecting worse conditions), 65 percent expected employment to remain the same as 2012, and 25 percent thought employment would increase (reported in Morgan et al. 2013, page 3). In the longer term (and on the basis of an older study and set of forecasts), manufacturing employment in Montana is expected to increase at an average annual rate of 1.3 percent through 2020 (Swanson 2012).

3.5 Tourism

This section provides an overview of current employment trends, earnings, and upcoming major projects in the tourism sector. For the purpose of the analysis, the sector was defined as the combination of two NAICS sectors, described in the textbox below.

NAICS 71 - Arts, Entertainment and Recreation

This sector comprises establishments primarily engaged in operating facilities or providing services to meet the cultural, entertainment and recreational interests of their patrons. These establishments produce, promote or participate in live performances, events or exhibits intended for public viewing; provide the artistic, creative and technical skills necessary for the production of artistic products and live performances; preserve and exhibit objects and sites of historical, cultural or educational interest; and operate facilities or provide services that enable patrons to participate in sports or recreational activities or pursue amusement, hobbies and leisure-time interests.

NAICS 72 - Accommodation and Food Services

This sector comprises establishments primarily engaged in providing short-term lodging and complementary services to travelers, vacationers and others, in facilities such as hotels, motor hotels, resorts, motels, casino hotels, bed and breakfast accommodation, housekeeping cottages and cabins, recreational vehicle parks and campgrounds, hunting and fishing camps, and various types of recreational and adventure camps. This sector also comprises establishments primarily engaged in preparing meals, snacks and beverages, to customer order, for immediate consumption on and off the premises.

Source: Statistics Canada, http://stds.statcan.gc.ca/naics-scian/2007/cs-rc-eng.asp?criteria=71 and http://stds.statcan.gc.ca/naics-scian/2007/cs-rc-eng.asp?criteria=72

3.5.1 Employment

In 2012, Tourism, as defined above, accounted for 13 percent of total employment in Montana, 10 percent of total employment in Alberta, and 9 percent in Saskatchewan (Bureau of Labor Statistics QCEW, Statistics Canada LFS).

Employment growth in the sector between 2002 and 2012 remained relatively flat, with average annual growth rates of 1.5 percent in Montana, 1.3 percent in Alberta and 0.3 percent in Saskatchewan (Figure 42). The impacts of the Great Recession were also less severe than in other sectors. Region-wide tourism employment fell by 1.4 percent in 2008, grew in 2009, and fell again in 2010 (-3.5 percent).

In terms of employment levels, Alberta had about 205,000 employees in the sector in 2012 (up from 190,000 in 2008), compared to 50,000 in Saskatchewan (down from 53,000 in 2008) and 58,000 in Montana (down from 59,000).

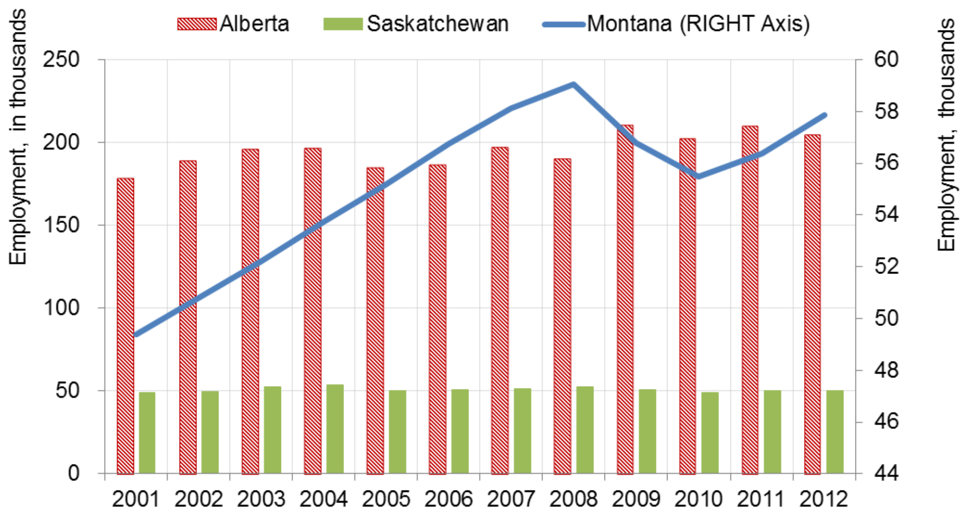

Figure 42: Employment in the Tourism Sector, 2001 – 2012

Source: Bureau of Labor Statistics QCEW, Statistics Canada LFS

In all states/provinces, the main source of "Tourism" employment was within the Accommodation and Food Services sector (NAICS 72). This is illustrated for Montana in Figure 43, along with a breakdown of sectoral employment by sub-sector.

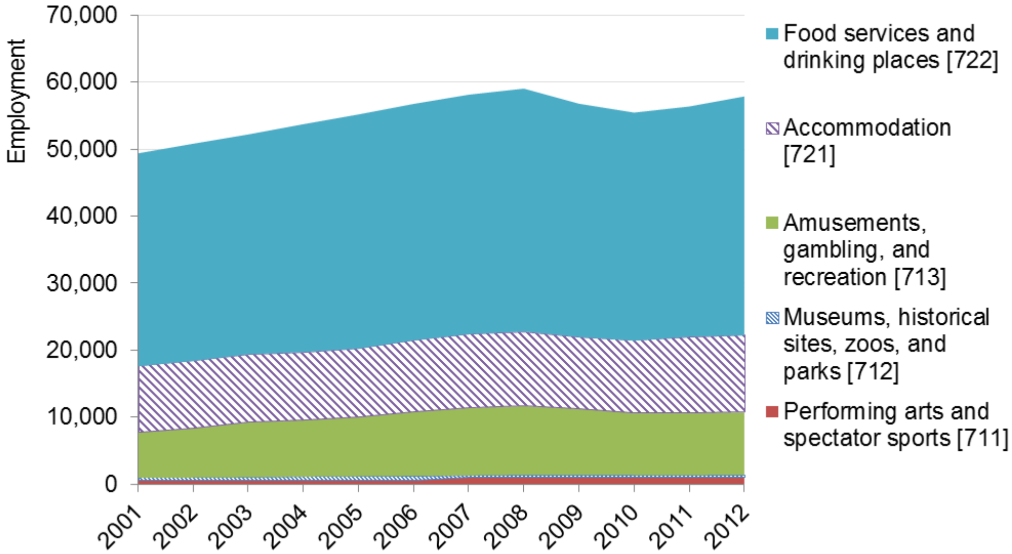

Figure 43: Employment in the Tourism Sector by Sub-Sector in Montana, 2001 – 2012

Source: Bureau of Labor Statistics QCEW

3.5.2 Earnings and Value Added

Average weekly earnings in the Tourism sector were significantly lower than in the rest of the economy (Figure 44). They increased steadily in current dollars during most of the 2001 – 2012 period, at an average annual rate of 3.5 percent in Montana, and 3.8 percent in both Canadian provinces. Of note, average weekly earnings fell in nominal terms in Alberta in 2012 (-1.3 percent) and in Saskatchewan in 2011 (-0.3 percent).

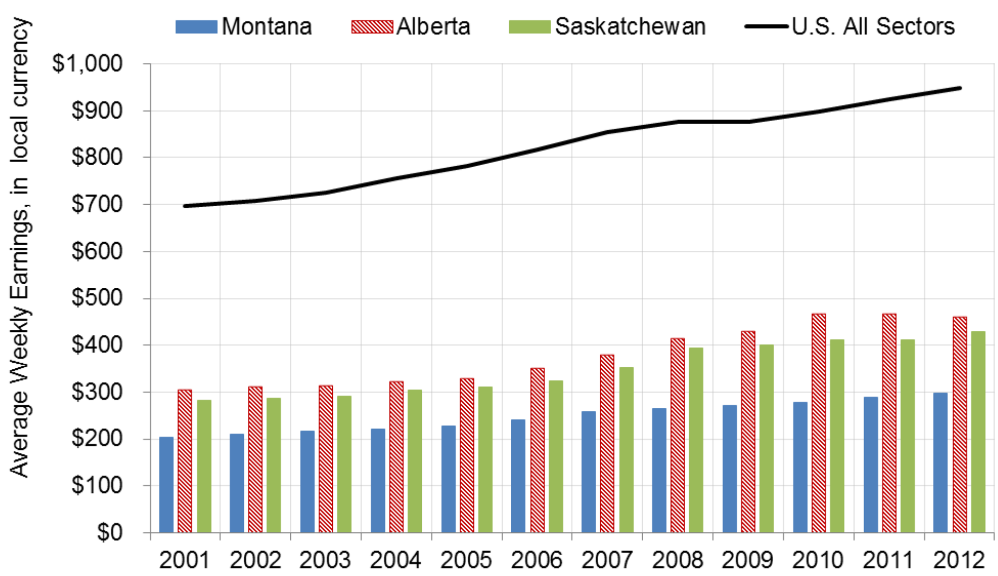

Figure 44: Average Weekly Earnings in the Tourism Sector, 2001 – 2012

Source: Bureau of Labor Statistics QCEW, Statistics Canada LFS

Changes in real GDP in the Tourism sector can be seen in Figure 45. Between 1998 and 2012, tourism-related activity grew at an average annual rate of 1.9 percent in Montana and 2.0 percent in Alberta. It actually shrank in Saskatchewan, by about 5 million of 2002 Canadian dollars (-0.6 percent overall).

Between 2008 and 2012, total value added in the sector grew at about 4.5 percent regionally (+2.7 percent in Montana, +5.2 percent in Alberta and +3.9 percent in Saskatchewan).

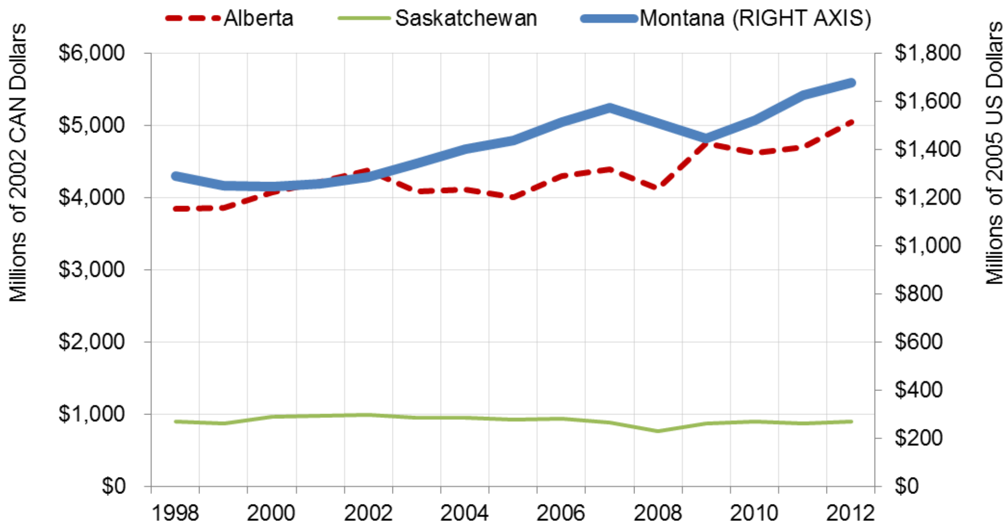

Figure 45: Total Value Added in the Tourism Sector, 1998 – 2012

Source: Bureau of Labor Statistics, Statistics Canada

3.5.3 Major Projects and Industry Outlook

Major projects in the Tourism and Recreation sector of Alberta's economy are summarized in Table 15. The number of projects and their cumulative investment value have been considerably scaled back relative to the pre-recession period. With C$3.9 billion of investment in early 2013, the sector only accounted for about 2 percent of total, economy-wide projects value. In Saskatchewan, major projects in Tourism and Recreation, proposed and underway, amounted to about C$760 million worth of capital investment, down by about 25 percent compared to 2010 (Government of Saskatchewan MPI).

Table 15: Major Projects in the Tourism Sector* in Alberta

Year	Number of Projects	Total Value of Projects in Millions of CAN Dollars	Average Project Value
2013	93	$3,918	$42.1
2008	110	$10,711	$97.4
2007	110	$9,338	$84.9
2006	160	$7,654	$47.8
2005	155	$5,898	$38.1
2004	128	$4,113	$32.1

** Limited here to "Tourism and Recreation"*
Source: Alberta Enterprise and Advanced Education (2013)

Employment in Alberta's Information, Culture and Recreation sector is expected to grow at an average annual rate of 1.5 percent between 2012 and 2017 (Alberta Employment and Immigration 2013). As in other sectors of the economy, employment would increase at a declining rate during the period, from +4.4 percent in 2013, to +0.5 percent between 2016 and 2017. Employment in Accommodation and Food Services is expected to grow by an average 1.1 percent annually over the next five years; with annual growth of 2.0 percent in 2013, 1.8 percent in 2014, and less than 1 percent in subsequent years.

While uncertain economic conditions and relatively high gasoline prices had a negative impact on Alberta's tourism in recent years, longer-term demographic changes are expected to positively influence the industry. The aging "baby boomer" generation, in particular, is expected to have more time for travel as retirement is reached, increasing the number of day and over-night trips to Alberta.

As noted earlier, tourism is a key contributor to Montana's economy. Climate change, however, is already having visible effects on the state and is introducing uncertainty regarding the future of the industry. Hunting, fishing, bird-watching, skiing, ATV riding and lake rafting are among the main activities that attract visitors to Montana. According to the Montana Bureau of Business and Economic Research, changes in temperature have already had an impact on these activities, negatively affecting revenue from tourism. A few years ago, the Montana Department of Fish, Wildlife & Parks closed several fishing streams due to decreased flows and warmer water temperatures. Decreased river flows also limit rafting available to visitors. Climate change also led to shorter skiing seasons, with less snow cover. Finally, several forestry and recreation areas were closed in past seasons due to higher wildfire risks.

In the shorter-term, employment growth in the tourism sector is expected to remain slow, but steady. According to job projections by the Department of Labor and Industry, employment in the Leisure and Hospitality occupational group would grow at an average annual rate of 1.8 percent between 2010 and 2020, or by about 20 percent overall during the period.

3.6 Wholesale and Retail Trade

This section provides an overview of recent developments in a combined Wholesale Trade and Retail Trade super-sector, as defined in the textbox below.

NAICS 41 – Wholesale Trade

This sector comprises establishments primarily engaged in wholesaling merchandise and providing related logistics, marketing and support services. The wholesaling process is generally an intermediate step in the distribution of merchandise; many wholesalers are therefore organized to sell merchandise in large quantities to retailers, and business and institutional clients. However, some wholesalers, in particular those that supply non-consumer capital goods, sell merchandise in single units to final users.

NAICS 44-45 – Retail Trade

The retail trade sector comprises establishments primarily engaged in retailing merchandise, generally without transformation, and rendering services incidental to the sale of merchandise. The retailing process is the final step in the distribution of merchandise; retailers are therefore organized to sell merchandise in small quantities to the general public.

Source: Statistics Canada, http://stds.statcan.gc.ca/naics-scian/2007/cs-rc-eng.asp?criteria=41 and http://stds.statcan.gc.ca/naics-scian/2007/cs-rc-eng.asp?criteria=44-45

3.6.1 Employment

In 2012, the Wholesale and Retail Trade super-sector employed 71,500 people in Montana (about 17 percent of total State employment), 322,400 people in Alberta (15 percent) and 80,600 in Saskatchewan (15 percent). In all three states/provinces, there was about 1 employee in wholesale for 3 employees in retail. In other words, employment in the Retail Trade sector represented about 75 percent of total employment in the super-sector.

The impact of the Great Recession was felt nearly equally across the region, with declines in sectoral employment between 2008 and 2009 of 5.2 percent in Montana, 5.0 percent in Alberta and 4.0 percent in Saskatchewan. Recovery was only partial in all three states/provinces, but somewhat slower in Montana, where employment in 2012 was still 6 percent lower than its pre-recession peak (Figure 46).

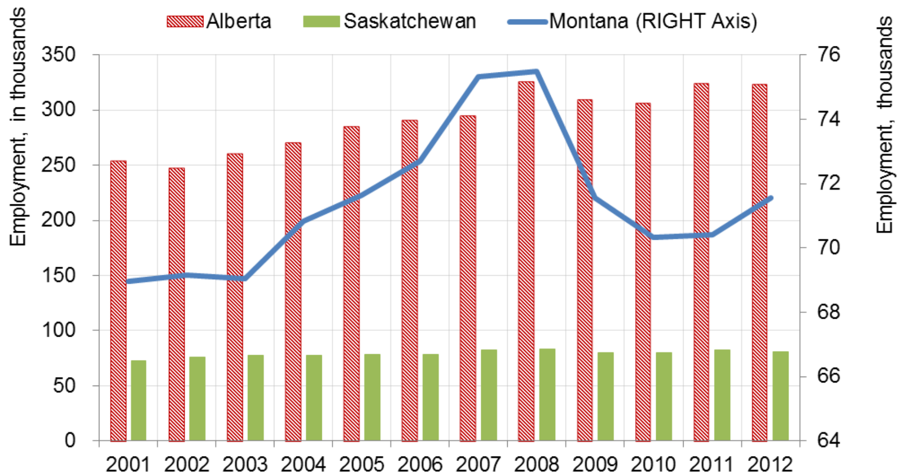

Figure 46: Employment in the Wholesale and Retail Trade Sectors, 2001 – 2012

Source: Bureau of Labor Statistics QCEW, Statistics Canada LFS

Overall, between 2001 and 2012, employment in Trade (Wholesale and Retail) grew at an average annual rate of 0.3 percent in Montana and 1.0 percent in Saskatchewan. Employment growth in Alberta was a lot stronger, averaging 2.2 percent annually.

3.6.2 Earnings and Value Added

Over the past 12 years, average weekly earnings in the sector grew in nominal terms at an average annual rate of 3.3 percent in Montana, 3.1 percent in Alberta and 3.4 percent in Saskatchewan. Throughout the period, they remained well below the national, economy-wide average. This is illustrated in Figure 47.

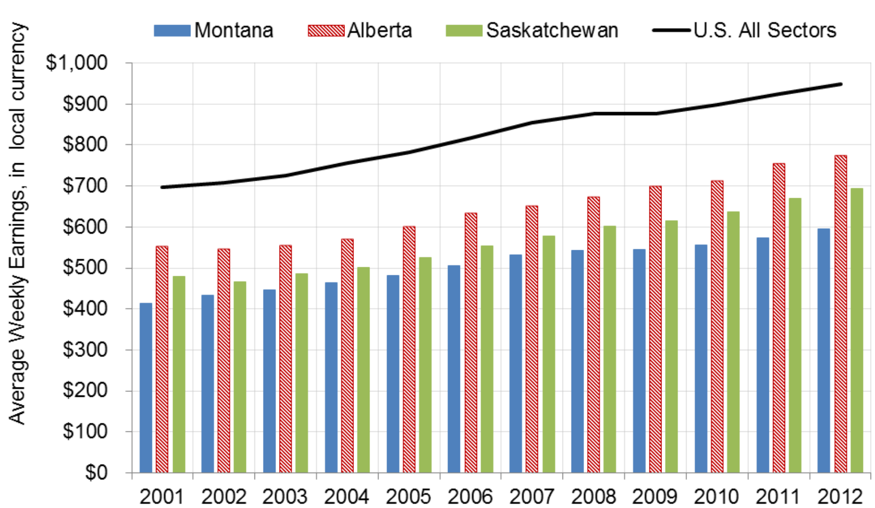

Figure 47: Average Weekly Earnings in the Wholesale and Retail Trade Sectors, 2001 – 2012

Source: Bureau of Labor Statistics QCEW, Statistics Canada LFS

Real GDP in the sector grew at an average annual rate of 2.5 percent for the three-state/province region. The growth was strongest in Alberta (+2.9 percent), and significantly weaker in Saskatchewan (+1.2 percent) (Figure 48).

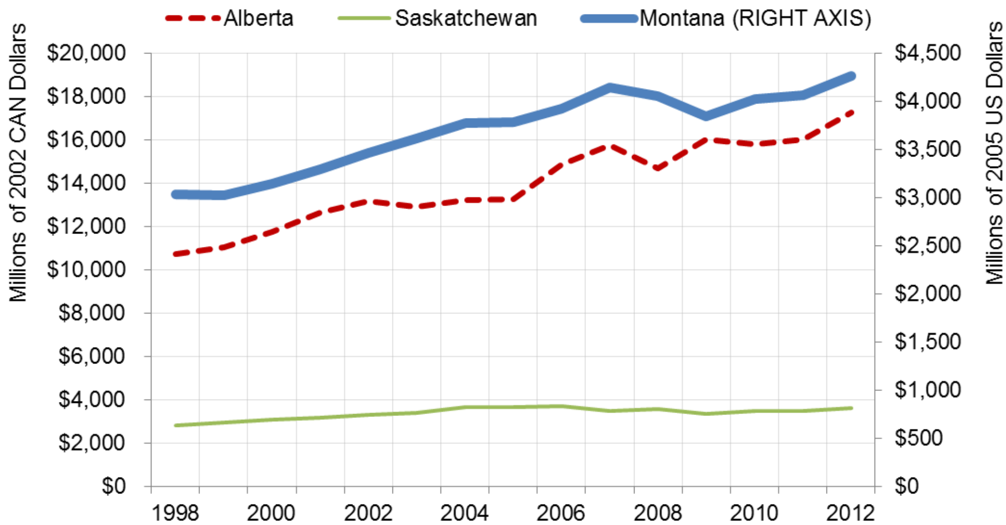

Figure 48: Total Value Added in the Wholesale and Retail Trade Sectors, 1998 – 2012

Source: Bureau of Labor Statistics, Statistics Canada

3.6.3 Industry Outlook

Employment in Alberta's retail trade industry, while expected to increase through 2017, is projected to do so at a declining rate. Retail employment is expected to increase by 4.6 percent in 2013, 2.4 percent in 2014, and 2.0 percent in 2015. After that year, employment would increase by less than 0.5 percent annually (Alberta Employment and Immigration 2013).

Increasing wage rates, as a result of the strong provincial economy and tightening labor markets, coupled with increasing commercial lease costs, are leading many retailers to invest in computerized check-out kiosks. These kiosks allow customers to self-check out and bag their purchases rather than hiring someone to do it. This will continue to have a negative impact on retail employment.

In Saskatchewan, the relative stability in the total value of investments proposed and underway in the retail sector (Table 16) suggests that recent growth in employment will continue, at least in the short run.

Table 16: Major Projects in the Retail Sector in Saskatchewan

Year	Number of Projects	Total Value of Projects in Millions of CAN Dollars	Average Project Value
2013	78	$2,210	$28.3
2012	90	$2,565	$28.5
2011	84	$2,807	$33.4
2010	79	$1,948	$24.7

Source: Government of Saskatchewan (2013)

Domestic and international investment in Alberta (in particular as a result of oil sand projects) is expected to stimulate the wholesale industry. Employment within the sector would grow at an average annual rate of approximately 1.6 percent between 2012 and 2017 (Alberta Employment and Immigration 2013), with – as in retail – stronger growth in the first half of the period.

Montana's wholesale and retail trade employment is expected to grow steadily in coming years, increasing by average annual rates of 0.8 percent and 1.0 percent respectively through 2020 (Swanson 2012). In the short term, the relative weakness in consumer spending, in Montana and nationally, may continue to dampen growth in retail. But emerging evidence of recovery in the housing market and energy-related employment growth opportunities in the Eastern part of the State may act in opposite direction and stimulate the sector, and the broader economy.

3.7 Summary of Chapter 3

The main lessons from this assessment of regional economic activity by sector can be summarized as follows:

1. In the past few years, the Mining, Quarrying and Oil and Gas Extraction sector has been the primary driver of economic growth in Alberta and Saskatchewan. Despite some uncertainty in relation to oil prices and pipeline capacity, growth in Alberta's oil sands is expected to continue at a solid rate. Growth prospects in oil production, potash production and uranium mining in Saskatchewan are also strong. In Montana, development of the Bakken formation has generated rapid employment growth in Eastern counties (in particular Richland), but investors' interest has – so far – remained focused on thicker sections of the formation in North Dakota. The North Dakota "oil boom" has led to rapid population growth in small towns in eastern Montana. This rapid growth has created various challenges (e.g., rising housing costs, overflowing sewers) and opportunities (e.g., residential development).

2. In Agriculture, farmers have benefited from relatively high crop prices (by historical standards), but forestry in Montana has yet to recover from the reduction in lumber demand associated with the 2008 housing bust. Employment growth in the sector is expected to remain low, but steady.

3. Strong growth is expected in the Construction sector across the region, as a result of energy development and associated infrastructure needs. Increased migration into the two Canadian provinces is also expected to stimulate the demand for, and construction of residential units.

4. Growth in manufacturing employment is expected to be relatively moderate in Alberta and Saskatchewan. A return to healthier growth is expected in Montana partly as a result of energy development in the East; but also through an anticipated "re-shoring" of overseas manufacturing jobs.

5. Growth in tourism is expected to remain low and steady; but is facing a mix of challenges (e.g., effects of climate change on the demand for outdoor activities such as skiing and water rafting; volatile fuel prices) and opportunities (e.g., increases in income and leisure time).

6. Along with employment and income growth, development of the regional economy is expected to generate additional commodity flows across the Montana – Canada border; in particular through increased U.S. exports of machinery and equipment to help support energy development in Alberta.

Recent statistics on freight movements across the US – Canada border are discussed in the next chapter.

4 FREIGHT MOVEMENT AND CROSS-BORDER TRADE

This chapter provides an overview of commodity flows between the United States and Canada, with an emphasis on trade passing through ports of entry in Montana.

In 2012, Canada remained the largest trading partner of the United States, with trade in goods by surface modes amounting to $518 billion; including $277 billion worth of imports (from Canada) and $242 billion in exports (to Canada). Of that total, about 4.6 percent passed through ports of entry in Montana (BTS 2013).

4.1 Commodity Flows from Canada via Montana Ports

The value of U.S. imports from Canada across the Montana-Canada border has increased almost threefold since 1998 to reach $11.9 billion in 2012; an average annual growth rate of 7.4 percent[16].

U.S. imports through Montana POEs decreased in value between 2011 and 2012, and were – in 2012 – well below the pre-recession peak of 2008 ($16.6 billion).

In 2012, 89 percent of U.S. imports ($10.6 billion) originated in Alberta, compared to 81 percent ($3.5 billion) in 1998. Of the remaining 11 percent, 3.3 percent originated in Saskatchewan and 0.9 percent in British Columbia, with the balance coming from the rest of Canada (Table 17).

Table 17: Value of Imports from Canada through Montana POEs (millions of U.S. Dollars)

Selected Years	Alberta	Saskatchewan	British Columbia	Rest of Canada	Total
1998	$3,513	$235	$157	$448	**$4,353**
2002	$5,898	$305	$157	$1,004	**$7,364**
2008	$15,287	$396	$105	$800	**$16,587**
2009	$7,901	$256	$65	$545	**$8,768**
2010	$10,025	$341	$169	$613	**$11,147**
2011	$11,450	$407	$105	$734	**$12,694**
2012	$10,560	$397	$110	$829	**$11,896**
Average Annual Growth Rates					
Full Period	8.2%	3.8%	-2.5%	4.5%	**7.4%**
2002 - 2012	6.0%	2.7%	-3.5%	-1.9%	**4.9%**
2008 - 2012	-8.8%	0.1%	1.2%	0.9%	**-8.0%**

Source: BTS (2013)

[16] Some of this growth is attributable to increasing commodity prices.

In terms of tonnage, imports from Canada across the Montana-Canada border have increased by only 5 percent between 1998 and 2012 (an average annual growth of 0.3 percent), from 11.8 million short tons in 1998 to 12.4 million in 2012. Total tonnage decreased by over 20 percent between 2007 and 2009, and was in 2012 still below its 1999 level (12.6 million tons).

Alberta's share of import volumes through Montana POEs has increased from 89 percent in 1998 to 92 percent in 2008, and has remained more or less constant since. At the same time, the share of import volumes from Saskatchewan has declined slightly, from 5.3 percent in 1998 to 4.8 percent in 2012. British Columbia's share has declined to 1.6 percent in 2012, from 3.9 percent in 1998 and a high of 4.5 percent in 2010 (Table 18).

Table 18: Volume of Imports from Canada through Montana POEs (thousands of short tons)

Selected Years	Alberta	Saskatchewan	British Columbia	Rest of Canada	Total
1998	10,540	622	465	200	**11,827**
2002	12,225	1,102	477	243	**14,047**
2008	13,374	625	178	338	**14,515**
2009	11,766	486	135	214	**12,600**
2010	12,172	696	618	201	**13,687**
2011	11,280	633	207	187	**12,307**
2012	11,421	600	194	202	**12,417**
Average Annual Growth Rates					
Full Period	0.6%	-0.3%	-6.1%	0.1%	**0.3%**
2002 - 2012	-0.7%	-5.9%	-8.6%	-1.8%	**-1.2%**
2008 - 2012	-3.9%	-1.0%	2.1%	-12.1%	**-3.8%**

Source: BTS (2013)

The large differences between growth rates in value (Table 17) and growth rates in volume (Table 18) reflects the increasing share of high-value commodities being shipped across the Montana border. This is attributable, mainly, to the rise in oil imports from Canada, in combination with increasing oil prices.

4.2 Commodity Flows from the U.S. to Canada via Montana

The value of U.S. exports through Montana POEs has more than tripled between 1998 and 2012, from \$3.1 billion to \$10.4 billion. This represents an average annual growth rate of about 9 percent over the period (Table 17). After a rapid decline in the aftermath of the 2008 financial meltdown (minus 30 percent between 2008 and 2009), exports recovered briskly in 2010 and 2011, and grew by about 5 percent in 2012. In that year, 91.7 percent of U.S. exports were destined for the province of Alberta, 3.5 percent to Saskatchewan, and 4.8 percent to other Canadian provinces (Table 19).

Table 19: Value of Exports to Canada through Montana POEs (millions of U.S. Dollars)

Selected Years	Alberta	Saskatchewan	British Columbia	Rest of Canada	Total
1998	$2,822	$108	$77	$76	**$3,083**
2002	$3,146	$90	$61	$78	**$3,375**
2008	$7,591	$246	$145	$259	**$8,241**
2009	$5,250	$181	$76	$254	**$5,760**
2010	$6,843	$218	$85	$644	**$7,790**
2011	$8,934	$429	$106	$408	**$9,877**
2012	$9,508	$358	$115	$383	**$10,364**
Average Annual Growth Rates					
Full Period	9.1%	8.9%	2.9%	12.2%	**9.0%**
2002 - 2012	11.7%	14.8%	6.6%	17.2%	**11.9%**
2008 - 2012	5.8%	9.9%	-5.5%	10.3%	**5.9%**

Source: BTS (2013)

4.3 Distribution of Commodity Flows by Port

The North American Transborder Freight Database, from which the information summarized in this section has been extracted, may not accurately represent where commodity flows occurred.

Because of filing procedures for trade documents, port-level data may or may not reflect where goods physically crossed the border. The filer of information may choose to file trade documents at one port while shipments actually enter or exit at another port (BTS 2013).

As a result, any information on the distribution of trade across POEs presented in this section should be interpreted with caution.

In 2012, over 80 percent of the total value of trade (imports plus exports) with Canada was handled through the POE at Sweet Grass ($17.9 billion, including $7.9 billion worth of imports). Another 14 percent was handled at the Great Falls Service Port ($3.0 billion, nearly all imports). Only three other ports handled more than $100 million worth of trade (Raymond, Piegan and Roosville); representing a cumulative 4.8 percent of total trade value (Figure 49).

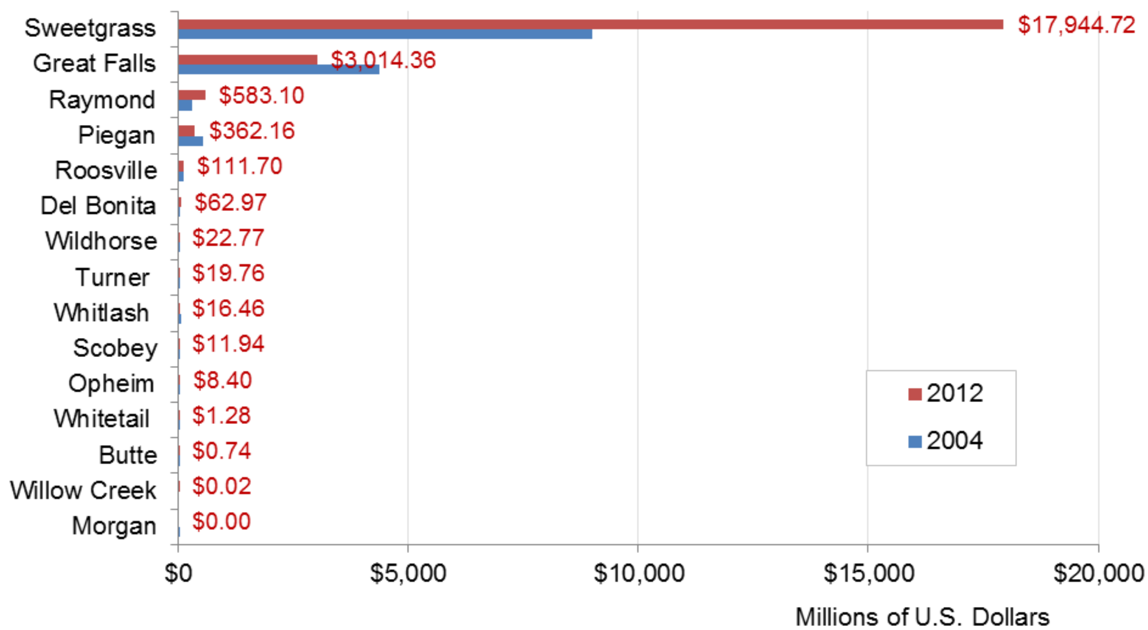

Figure 49: Value of Trade (Imports & Exports) with Canada through Montana POEs, 2004 and 2012

Source: BTS (2013)

About $23 million worth of trade transited through the Port of Wild Horse in 2012 (0.1 percent of the total value of cross-border trade through Montana ports); and no trade was reported for the Port of Morgan in that year.

As noted above, because of filing procedures, port-level data may not accurately reflect the location of goods movements across the border. This may explain the lack of trade being reported at the Port of Morgan in 2012.

Imports from Canada in volume (in thousands of U.S. short tons) are shown in Figure 50. In 2012, about 70 percent of total import tonnage was handled at Sweet Grass (versus 90 percent in 2004) while another 20 percent was handled at the Great Falls Service Port. Piegan, Raymond and Roosville respectively handled 4.4, 2.4 and 1.1 percent of total import tonnage. About 0.3 percent of imports were handled at Wild Horse.

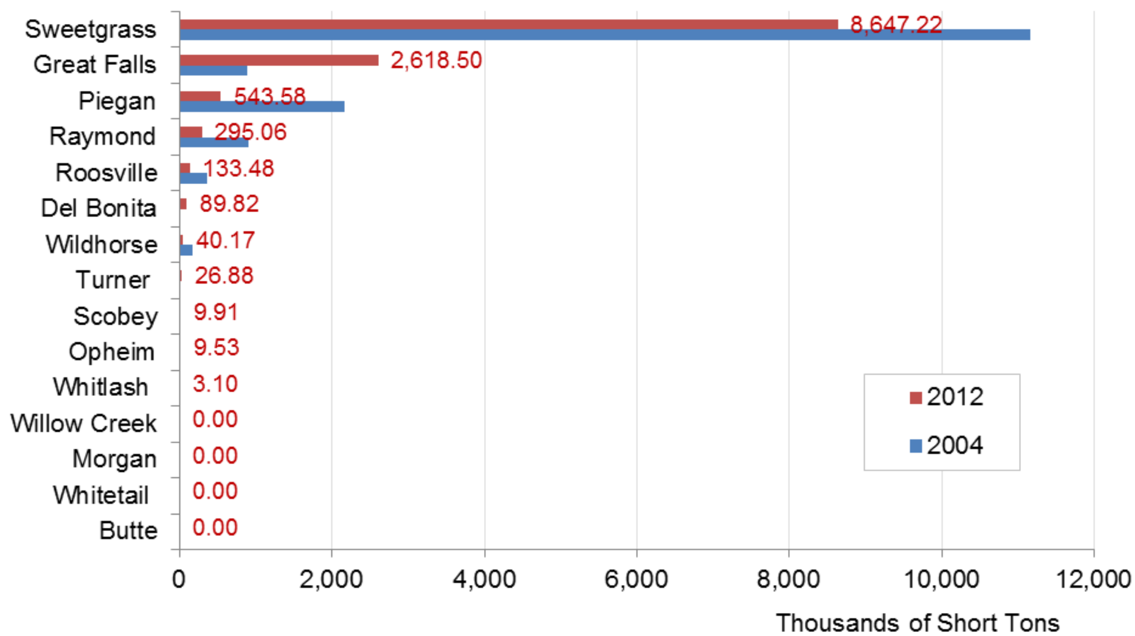

Figure 50: Volume of Imports from Canada through Montana POEs, 2004 and 2012

Source: BTS (2013)

4.4 Distribution of Commodity Flows by Mode

In 2012, imports from Canada by pipeline represented about 50 percent of the total value of imports through Montana ports, down from about 62 percent in 2008. Imports by truck accounted for nearly 44 percent of the total (Figure 51), with the balance (about 6 percent) transported by rail or other modes.

While the total value of imports in 2012 ($11.9 billion) was significantly lower than in 2008 ($16.6 billion), the share of imports transported by truck rose during the same period, from 33 to 44 percent. In other words, a large portion of the decline in total import value in the aftermath of the Great Recession is attributable to reductions in oil imports (in value).

After the trough of 2009, the value of imports by truck grew at an average annual rate of 15 percent (from $3.4 billion in 2009 to $5.2 billion in 2012); and the value of imports by pipeline at an annual rate of 7 percent (from $4.9 billion to $6.0 billion). Shipments by rail recovered quickly in 2010, and then stabilized around $0.7 billion in 2011 and 2012.

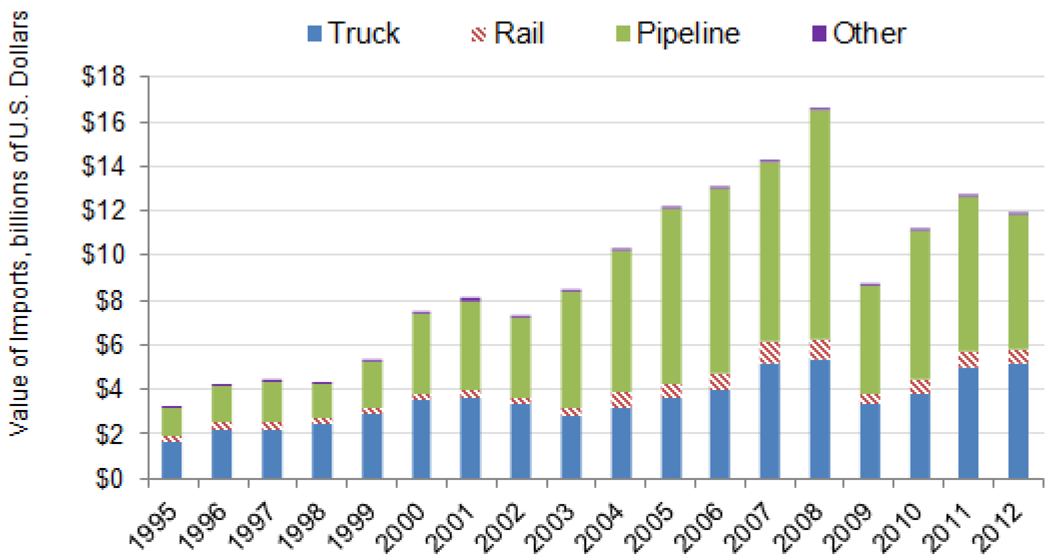

Figure 51: Value of Imports from Canada through Montana POEs by Mode, 1995 – 2012

Source: BTS (2013)

U.S. exports to Canada through Montana are dominated by truck transportation, which accounted for over 90 percent of the total value of exports in 2012 (Figure 52). The share of trucks in total cross-border shipments increased by about 5 percentage points between 2008 and 2012, while the portion shipped by rail declined by about the same amount (4 percentage points).

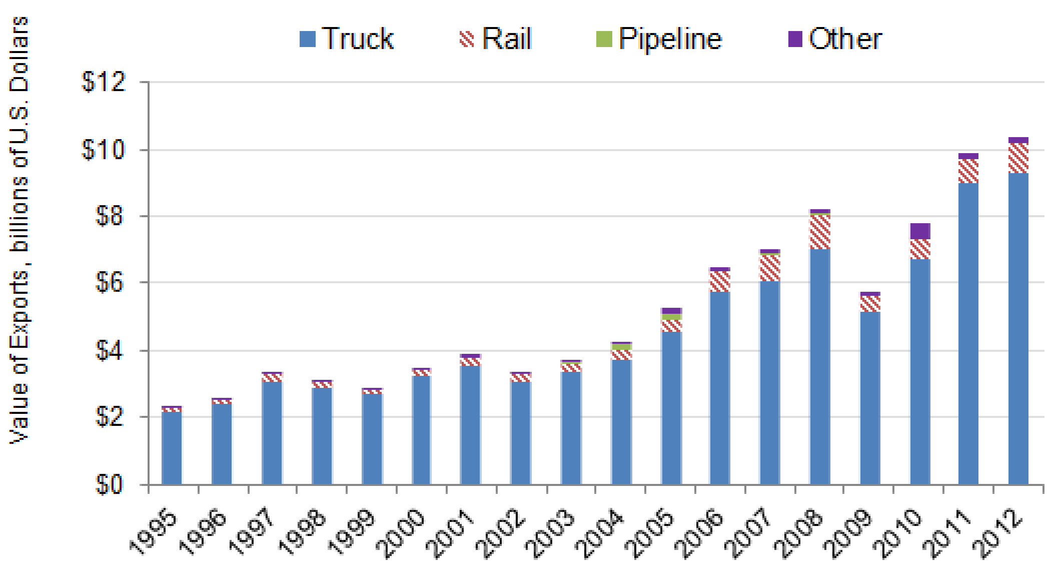

Figure 52: Value of Exports to Canada through Montana POEs by Mode, 1995 – 2012

Source: BTS (2013)

Over the full period represented in Figure 52 (1995 to 2012), the value of U.S. exports to Canada by truck increased significantly, from $2.3 billion at the beginning of the period to $9.3 billion in 2012 (an average annual growth of 8.9 percent). Exports by truck have also fully recovered from the 2008 recession: the 2012 estimate of $9.3 billion is about 32 percent higher than the pre-recession peak of 2008 ($7.0 billion).

4.5 Distribution of Commodity Flows by Commodity

Mineral Fuels, Oils and Waxes represented about 53 percent of the total value of imports from Canada through Montana POEs, amounting to $6.4 billion in 2012 (Figure 53). Machinery and Mechanical Appliances (including Nuclear Reactors, Boilers, and parts thereof) were the second most traded commodity ($1.6 billion), followed by Meat and Edible Meat Offal products ($0.6 billion) and Fertilizers ($0.3 billion).

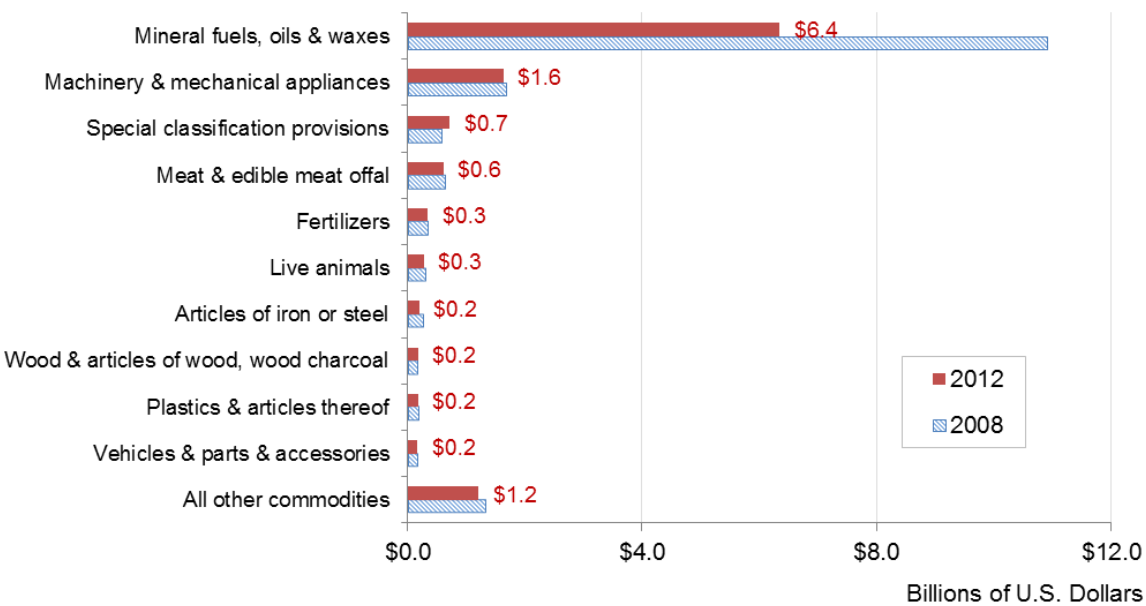

Figure 53: Value of Imports from Canada through Montana Ports by Commodity, 2004 and 2012

Source: BTS (2013)

Machinery and Equipment accounted for about 50 percent of U.S. exports to Canada through Montana ports (Figure 54); including 29 percent for Machinery and Mechanical Appliances ($3.0 billion in 2012); 12 percent for Vehicles -- other than railway or tramway rolling stock -- and Parts and Accessories thereof ($1.3 billion); and 8 percent for Electrical Machinery and Equipment and Parts thereof, including sound recorders and reproducers ($0.9 billion). Exports of Articles of Iron or Steel and Mineral Fuels, Oils and Waxes came in fourth and fifth, with $0.6 billion and $0.5 billion, respectively.

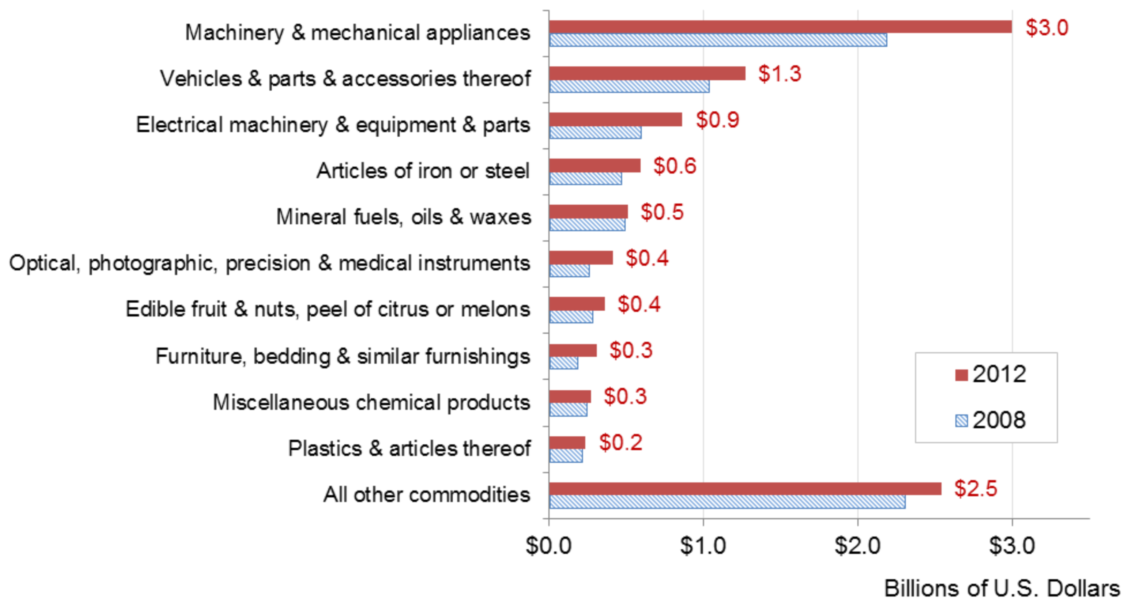

Figure 54: Value of Exports to Canada through Montana Ports by Commodity, 2004 and 2012

Source: BTS (2013)

4.6 Distribution of Commodity Flows by Origin & Destination

In 2012, about 90 percent of the total value of trade (imports plus exports) between the U.S. and Canada through Montana POEs was with the Province of Alberta (BTS 2013). Saskatchewan accounted for 3.4 percent of the total; and British Columbia for another 1.0 percent.

About 28 percent of the total value of exports to Alberta through Montana POEs originated in Texas and another 17 percent in California. Montana was the fourth largest exporter, with about 4 percent of the total (Figure 55).

About 15 percent of the total value of exports to Saskatchewan through Montana POEs originated in Texas, 11 percent in Montana, 10 percent in California and 6 percent in Illinois (BTS 2013).

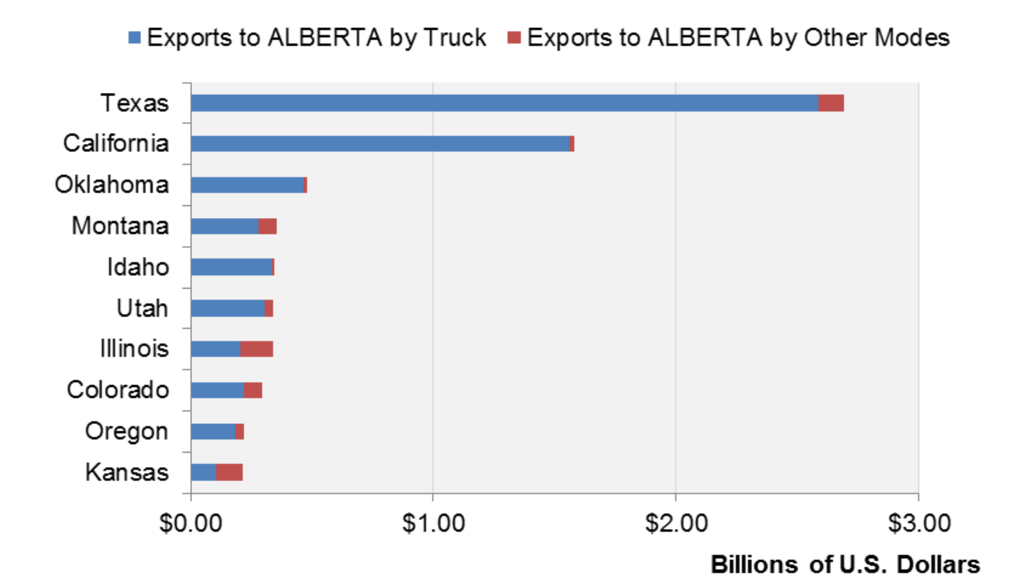

Figure 55: Value of Exports to Alberta through Montana POEs by Top-10 Exporters, 2012

Source: BTS (2013)

With respect to imports from Alberta through Montana ports, Montana was by far the number one importer (45 percent of the total), followed by Texas (12 percent) and New York (11 percent) (Figure 56).

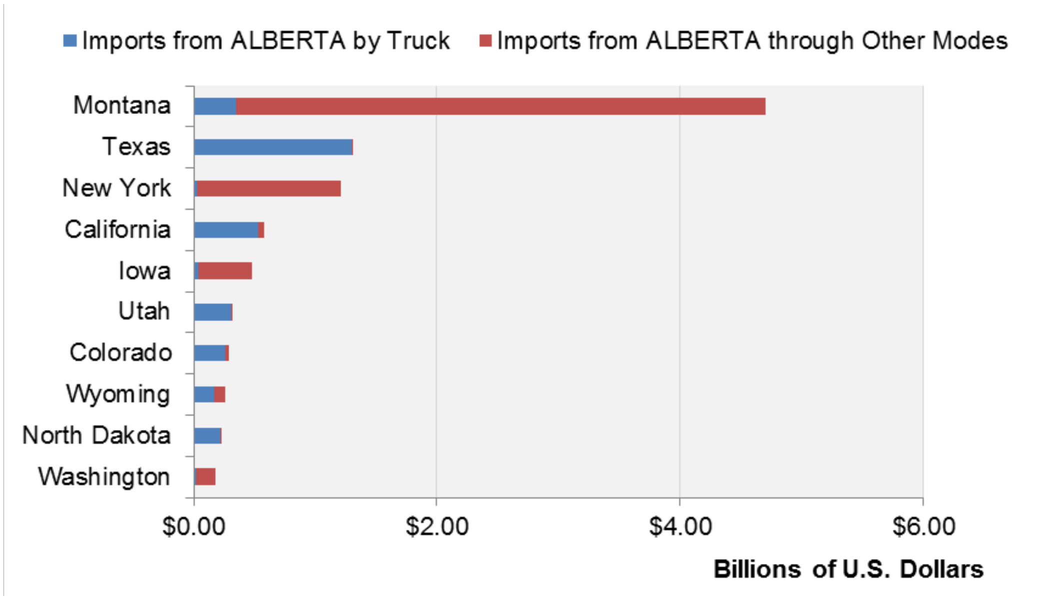

Figure 56: Value of Imports from Alberta through Montana POEs by Top-10 Importers, 2012

Source: BTS (2013)

Imports from Saskatchewan through POEs in Montana were destined primarily to Montana (27 percent of the total), California (25 percent), North Dakota (8 percent) and Colorado (7 percent) (BTS 2013).

4.7 Truck Traffic through Montana Ports

In 2012, of the estimated $22.3 billion worth of trade (imports plus exports) between the U.S. and Canada through Montana ports, $14.5 billion (about 65 percent) was carried by truck. As noted in Section 4.4, over the past decade, truck traffic across the Montana border has expanded significantly. This is illustrated further in Figure 57.

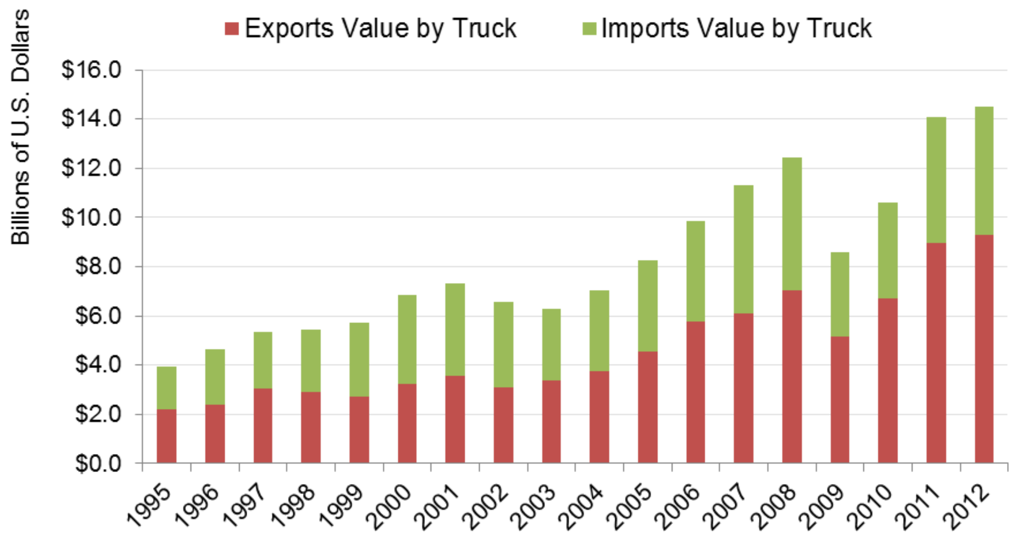

Figure 57: Value of Truck Trade through Montana Ports, 1995 – 2012

Source: BTS (2013)

Of the total value of trade by truck through the Montana-Canada border, about 94.5 percent was handled at Sweet Grass (BTS 2013). This reflects the fact that Sweet Grass is the only border crossing that offers an interstate highway connection into Montana. Until recently (November 2009), it was also the only 24-hour commercial port between the United States and Alberta.

The port of Raymond, which connects Montana with the province of Saskatchewan accounted for about 4.0 percent of total cross-border flows by truck, while the Port of Roosville (a 24-hour commercial port since November 2009), which connects Montana with the province of British Columbia, accounted for about 0.6 percent of the total (BTS 2013).

Changes in the volume of imports (in short tons) by truck from Canada through Montana ports are illustrated in Figure 58. As can be seen in the chart, the abrupt post-2008 decline in import tonnage affected all major Montana ports equally.

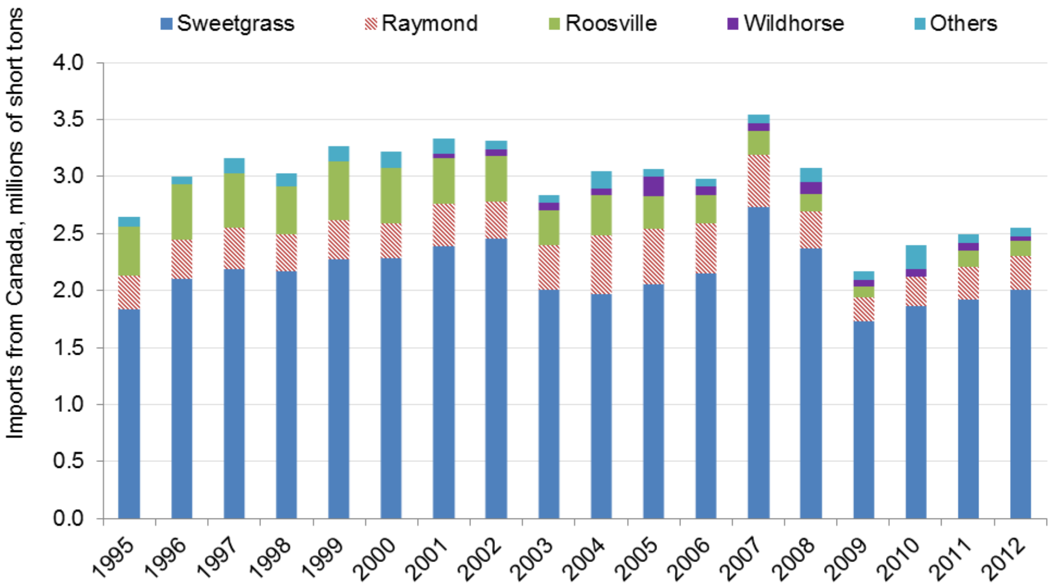

Figure 58: Truck Imports from Canada through Montana Ports, 1995 – 2012

Source: BTS (2013)

A distribution of southbound commodity flows by truck between Canadian provinces is provided in Figure 59. In 2012, 73 percent of southbound trucks passing through Montana ports originated in Alberta, 16 percent in Saskatchewan and 11 percent in other provinces including British Columbia. Over the period (1995 to 2012), the share of Alberta increased by 12 percentage points (61 to 73 percent); the share of Saskatchewan by 2 percentage points.

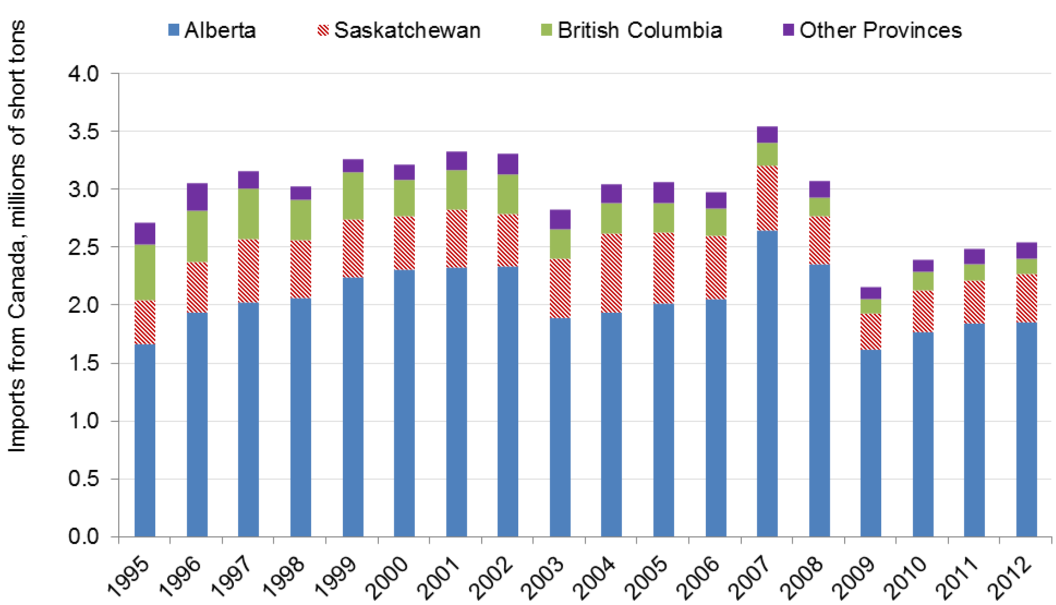

Figure 59: Truck Imports from Canada through Montana Ports by Province of Origin, 1995 – 2012

Source: BTS (2013)

4.8 Summary of Chapter 4

The main lessons from this overview of cross-border freight flows can be summarized as follows:

1. U.S. imports from Canada through Montana POEs have decreased in value and volume since their pre-recession peak of 2008. Growth resumed after 2009, but total import value was about 30 percent lower in 2012 than four years earlier (and about 14 percent lower in tonnage).

2. After a sharp decline in 2009, U.S. exports to Canada increased steadily in 2010 and 2011, and exceeded their pre-recession peak by over $2.0 billion in 2012.

3. The distribution of total trade (imports plus exports) by port was extremely skewed towards a few commercial ports (in particular Sweet Grass and the Great Falls Service Port); but available trade statistics may not accurately represent the true location of trade flows due to filing procedures.

4. A surprisingly large percentage of U.S. exports through Montana ports originated in Southern and Mid-Western states, including Texas and Oklahoma. Texas was also the largest importer of Canadian products transiting through the Montana-Canada border by truck.

5. Alberta accounted for about 90 percent of total trade value (imports plus exports) through Montana POEs in 2012; down from 92 percent in 2008. 73 percent of southbound freight volumes shipped across the border by truck originated in the Province.

The research findings presented in chapters 2, 3 and 4 have informed – directly or indirectly – the economic and traffic forecasts summarized in Chapter 6. The methods and tool used in the production of these forecasts are described in Chapter 5.

5 FORECASTING METHODOLOGY AND TOOL

This chapter provides a description of the methodology and tool developed during the ICED 1 Study and updated, here, to reflect recent changes in the regional economy and cross-border commodity flows (summarized in chapters 2, 3 and 4), and to account for additional operational and policy changes. The tool generates forecasts of Annual Average Daily Traffic (AADT) for trucks, commercial autos (i.e., passenger vehicles traveling for commercial purposes[17]), and total traffic at selected ports and along connecting highways over a twenty-year period.

5.1 Methodology Overview

The methodology first relates economic activity and cross-border trade to actual traffic volumes, observed in 2012. Once the economic, trade and traffic relationships are established in the base year, those relationships are applied to projections of economic activity by sector to generate a forecast of future trade flows and highway traffic. The forecast is generated for every year between 2012 and 2032.

Key inputs and data to the forecasting model include:

- Traffic counts at all border crossings and along the highway segments considered in the ICED 1 study[18];
- Percent of total traffic that is truck, and percent of freight shipments carried by truck;
- Border crossing operating hours;
- Gross Domestic Product by sector (i.e., total value-added), along with future expected GDP growth in Alberta and Saskatchewan, by sector;
- Trade flows and commodity data from the Bureau of Transportation Statistics (BTS) North American Transborder Freight database;
- Findings from the stakeholder interviews;
- Projections of future oil prices; and

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[17] Commercial here should be understood broadly. Commercial auto traffic includes on-the-clock business travel and trips by visitors for tourism, recreation or shopping purposes. Family visits and commuting trips, on the other hand, are excluded.

[18] The port of Whitetail was closed in January 2013. Historical data for the port are included in the updated forecasting tool, but no port-specific traffic forecast was prepared.

- Other parameters (such as the average payload per truck, or the average value of imports / exports in dollars per ton).

The revised, Phase 2 model also uses cross-border freight projections developed for the Federal Highway Administration, under the Freight Analysis Framework (FAF) program. These projections are used for model calibration and validation.

5.2 Methods and Data Sources

The forecasting approach first estimates a relationship between economic activity and traffic counts, for the base year (2012). Variances between estimated AADT and actual traffic counts generate adjustment factors, so that the relationship between GDP and traffic volumes can be validated. Commodity flow data from BTS provide estimates of the dollar value and tonnage of commodity flows by truck through Montana ports. In particular, the estimates of 2012 truck volumes are compared with actual truck counts, with adjustments made to average payload per truck. Traffic forecasts are developed using risk-based economic forecasts by sector, along with other socio-economic factors (such as future oil prices or productivity).

Base Year Economic and Trade Data

The data summarized in Chapter 3 of this report are used to estimate the total production value of major economic sectors (i.e., Mining and Oil and Gas Extraction, Agriculture, Construction, Manufacturing, Retail / Wholesale Trade, and Tourism) for Alberta and Saskatchewan. The BTS Transborder Freight database provides estimates of value and tonnage for trade between regions, by commodity and mode of transportation.

Traffic Volumes in the Base Year

In the base year (2012), total truck and auto traffic are allocated by taking the actual distribution of traffic by border crossing and highway segment, derived from the latest traffic counts obtained from MDT. Thus, current traffic patterns (differentiated between trucks and autos) are used as a starting point for determining port- and highway-specific volumes.

Future Industry and Economic Growth

Forecasts of future economic activity and industry growth (i.e., growth in Gross Domestic Product by 2-digit NAICS code) are estimated within a risk range, based on the following data sources:

- Historical rates of GDP growth by sector for Alberta and Saskatchewan, from Statistics Canada;
- Provincial and sector-level outlooks, summarized in Chapter 3;
- Findings from the stakeholder interviews; and

- Forecasts of cross-border commodity flows from FHWA (FAF).

These data were compiled by HDR and summarized as ranges of possible values; with each range characterized by a low, a high, and a most-likely value.

Allocating AADT in Forecast Years

Volumes of truck and non-truck traffic were allocated to Montana ports on the basis of a number of quantitative and qualitative factors, including:

- Historical distribution of traffic by port;
- Findings from the stakeholder interviews;
- Industry growth trends and outlook (by geography); and
- Assumptions regarding POE hours of operations (see Chapter 6).

Congestion/Operational Assumptions

The levels of congestion currently experienced along the north-south highway corridors within the study area are low and consistent with a Level of Service A (Table G-10). Consequently, the traffic forecasts presented in this report do not explicitly account for changes in travel time or delay. In terms of POE operations, all traffic forecasts were first developed based on current hours of operations at all POEs. The assumptions used in the estimation of additional traffic (diverted or induced) brought about by extended port operations are presented in Chapter 6.

North-South Directional Split

Based on traffic counts obtained from MDT, the volume of southbound traffic, from Canada to the U.S., through Montana ports was consistently between 48 and 63 percent of total traffic (i.e., traffic in both directions), from 2008 to 2012[19]. This suggests that even as total traffic volumes vary, the share of traffic by direction was relatively constant across ports. In addition, in 2012, about 92 percent of truck tonnage from Canada through Montana ports originated in Alberta, with another 5 percent from Saskatchewan. Thus, the methodology and tools are focused on economic growth in these two provinces.

[19] This is across all individual ports in the ICED 1 Study Area. The weighted average directional split fluctuated from 50 to 52 percent between 2008 and 2012 (with traffic volumes used as weights). Over the longer term, between 1997 and 2012, the weighted average share of southbound traffic (in total traffic) declined steadily, from about 57 percent in 1997 to 51 percent in 2012.

POE and Connecting Highway Volumes

This report provides estimates of future traffic volumes at selected POEs and for relevant connecting highways in northern Montana[20]. With the exception of Sweet Grass, where traffic volumes at the POE represent most of the traffic on the segment of I-15 included in the study area (over 90 percent on average, between 2007 and 2012), traffic volumes at individual border crossings typically represent only a small fraction of connecting highway traffic (20 percent for the POE Morgan; 11 percent for the POE at Wild Horse). Consequently, future growth rates at the POEs do not significantly affect overall traffic volumes on connecting highway[21].

Historical Growth Trend Comparison

Projections of future truck and auto traffic volumes were compared to historical trends to ensure that the forecasts were credible. For each POE and connecting highway, historical growth rates were determined based on traffic volumes between 1998 and 2012. Historical trends were defined after eliminating outliers, i.e., the highest and lowest growth rates observed during the analysis period.

5.3 Forecasting Model

The forecasting model developed in Phase 1 is focused on projections of economic activity in Canada (Alberta and Saskatchewan), and the traffic volumes generated from industry-specific growth opportunities, which are then allocated to Montana ports and highways.

A structure and logic diagram illustrating the main data and assumptions included in the forecasting model is presented in Figure 60. The model was built from relationships between economic growth and traffic volumes estimated with historical data, and augmented with risk-adjusted assumptions about industry growth, modal shares, oil prices, and other factors (e.g., average truck payload; average value of imports/exports in dollars per ton).

The estimation of truck traffic is based primarily on projected GDP growth in five sectors of the economy: Mining and Oil/Gas Extraction; Agriculture; Construction; Manufacturing; and Wholesale Trade and Distribution. The commodities produced and/or used within these sectors represent the majority of freight movements by truck. The model also accounts for empty trucks, which represented about 10 to 25 percent of all truck trips between 2007 and 2012 (BTS 2013)[22].

[20] These include all highway segments connecting the selected ports to US-2.

[21] In the forecasting model, the growth in traffic on connecting highways includes two separate components: POE-related growth (which depends on projections of cross-border freight flows and passenger vehicles) and local traffic growth (determined primarily on the basis of historical traffic data).

[22] These estimates are based on the number of loaded and empty truck containers reported at all POEs within the ICED 1 Study Area (southbound only).

Estimation of commercial auto volumes is driven primarily by tourism-related industries, including Accommodation and Food Services, Entertainment and Recreation, or Retail Trade. Other traffic is assumed to grow with overall GDP.

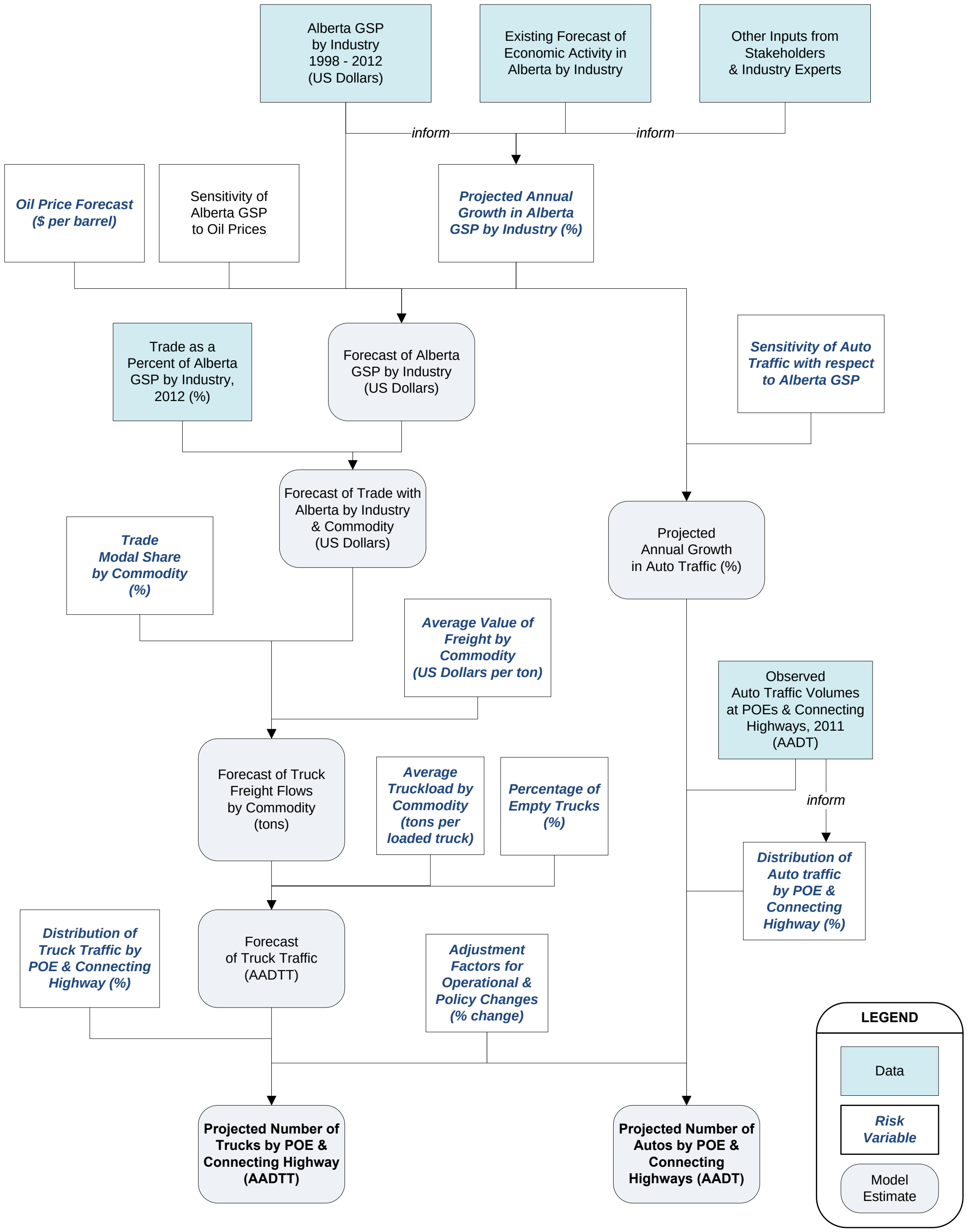

Figure 60: Structure and Logic Diagram for the Development of Economy-Based Forecasts

Source: HDR

The structure and logic diagram in Figure 61 illustrates the trend analysis used for validation. The purpose of this analysis, again, is to determine whether the traffic forecasts developed on the basis of economic growth projections are compatible with recent traffic data.

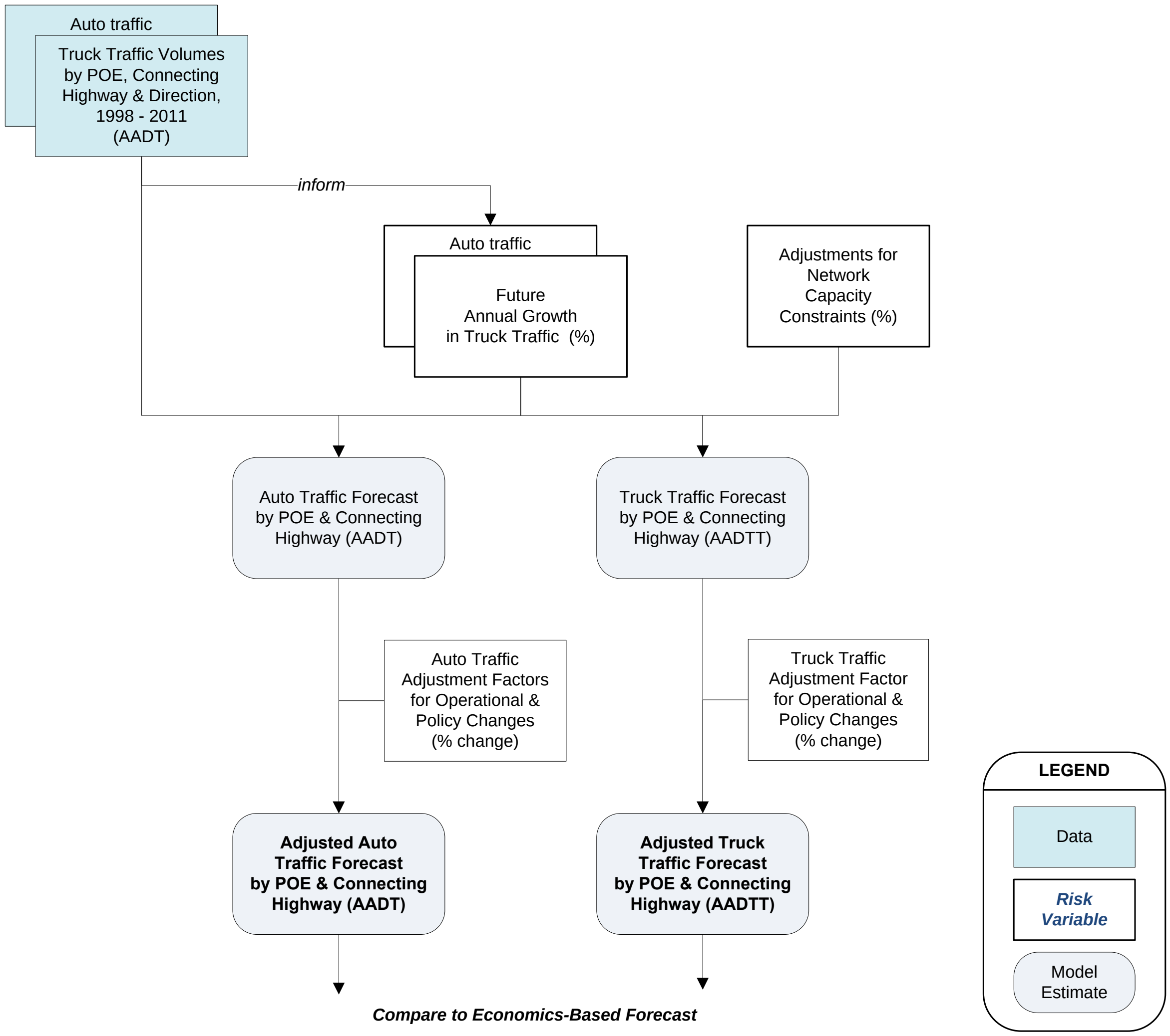

Figure 61: Structure and Logic Diagram for the Development of Trends-Based Forecasts

Source: HDR

5.4 Forecasting Assumptions

This section describes the specific assumptions used in the development of the traffic forecasts presented in Chapter 7. These forecasting assumptions are broken-down into two major groups: economy-related assumptions (Section 5.4.1) and transportation-related assumptions (Section 5.4.2).

5.4.1 Economy-Related Assumptions

Future economic growth in Alberta and Saskatchewan provides a basis for forecasting trade flows through Montana POEs. GDP growth projections were developed by sector to account for future expected growth differentials (e.g., between Agriculture and Oil/Gas Extraction), and for differences in the propensity of individual sectors to generate cross-border trade.

The assumed growth rates for Alberta and Saskatchewan are shown in Table 20. They were derived from a variety of sources, including:

- Short-term and medium-term provincial outlooks developed in the financial community;
- Employment projections prepared by the Government of Alberta; and
- Information collected during the stakeholder interviews.

Three sets of growth rates were used in the economic forecasts for the two provinces:

- Short-term forecasts, with growth projections for individual years between 2013 and 2015;
- Medium-term forecasts, with average annual growth projections applicable over the period 2016 – 2021; and
- Long-term forecasts, with average annual growth projections applicable between 2022 and 2032.

Table 20: Ranges of Probable Values for Economic Growth in Alberta and Saskatchewan

Variable	Forecast Year	Alberta			Saskatchewan		
		Low	Most Likely	High	Low	Most Likely	High
Provincial GDP	**2013**	**2.5%**	**2.8%**	**3.2%**	**2.1%**	**2.4%**	**2.7%**
	2014	**1.7%**	**3.6%**	**4.1%**	**1.4%**	**2.8%**	**3.1%**
	2015	**1.3%**	**2.8%**	**3.2%**	**1.3%**	**2.5%**	**2.8%**
	2016 – 2021	**1.4%**	**2.5%**	**4.3%**	**1.0%**	**2.3%**	**2.9%**
	2021 – 2032	**1.4%**	**2.5%**	**4.3%**	**1.0%**	**2.3%**	**2.9%**
Mining, Quarrying, Oil & Gas Extraction	2013*	-5.0%	-5.6%	-6.4%	-4.2%	-4.8%	-5.4%
	2014	2.5%	5.2%	5.9%	2.0%	4.1%	4.5%
	2015	2.0%	4.4%	5.0%	2.0%	3.9%	4.4%
	2016 – 2021	0.5%	0.8%	1.4%	0.3%	0.8%	1.0%
	2021 – 2032	0.5%	0.8%	1.4%	0.3%	0.8%	1.0%
Agriculture	2013	4.2%	4.8%	5.4%	3.6%	4.1%	4.6%
	2014	0.6%	1.3%	1.4%	0.5%	1.0%	1.1%
	2015	0.3%	0.7%	0.8%	0.3%	0.6%	0.7%
	2016 – 2021	1.1%	1.9%	3.3%	0.8%	1.8%	2.2%
	2021 – 2032	1.1%	1.9%	3.3%	0.8%	1.8%	2.2%
Construction	2013	4.7%	5.3%	6.1%	4.0%	4.5%	5.1%
	2014	2.1%	4.5%	5.1%	1.8%	3.5%	3.9%
	2015	1.3%	2.8%	3.2%	1.3%	2.5%	2.8%
	2016 – 2021	1.9%	3.5%	6.0%	1.4%	3.2%	4.0%
	2021 – 2032	1.9%	3.5%	6.0%	1.4%	3.2%	4.0%
Manufacturing	2013	0.8%	0.9%	1.0%	0.7%	0.8%	0.8%
	2014	0.6%	1.3%	1.5%	0.5%	1.0%	1.1%
	2015	0.7%	1.6%	1.8%	0.7%	1.4%	1.6%
	2016 – 2021	0.6%	1.0%	1.8%	0.4%	1.0%	1.2%
	2021 – 2032	0.6%	1.0%	1.8%	0.4%	1.0%	1.2%
Wholesale & Retail Trade	2013	5.3%	6.0%	6.8%	4.5%	5.1%	5.7%
	2014	2.8%	6.0%	6.9%	2.3%	4.7%	5.2%
	2015	2.2%	4.7%	5.3%	2.2%	4.2%	4.7%
	2016 – 2021	2.6%	4.6%	7.8%	1.8%	4.2%	5.3%
	2021 – 2032	2.6%	4.6%	7.8%	1.8%	4.2%	5.3%

Note: Government of Alberta Employment and Immigration (2013) foresees relatively sizeable reductions in employment in the Mining, Quarrying, and Oil & Gas Extraction sector of Alberta's economy in 2013. The estimates shown in this table reflect these projections (after adjustment for changes in productivity).
Sources: HDR Analysis based on BMO (2013), TD Economics (2012), TD Economics (2013), RCB (2013), Government of Alberta Employment and Immigration (2013), and interviews with subject matter experts and regional stakeholders

5.4.2 Transportation-Related Assumptions

As can be seen in Figure 60, a number of transportation-related assumptions are needed to transform future expected GDP growth into cross-border freight flows and commercial traffic. These include the average value of trade; average truck payload; future expected oil prices; and percentage of empty trucks. Each of these assumptions is discussed briefly below.

The average value of trade (in dollars per short ton) was calculated for each major industry, in order to estimate trade volumes (in short tons[23]) from future estimates of trade value (in dollars) by industry. These estimates were derived from data from the North American Transborder Freight database maintained by BTS, for ninety nine individual commodities. These commodities were paired up with the appropriate industry (e.g., Fabricated Metal Products were associated with Manufacturing) to provide estimates of tonnage and dollar values by industry. Service-based industries that do not produce physical goods were generally excluded from the calculations. Data from the FHWA Freight Analysis Framework were used for validation (Section 5.5), and to derive estimates of dollars per ton for exports.

In the forecasting model, the average payload per truck (in short tons per loaded truck) is applied to the estimates of total tonnage to derive the number of loaded trucks passing through Montana ports. The average payload was calibrated so that the number of trucks estimated in the model would match the actual truck counts reported by MDT. The additional calibration factors considered in Phase 1 of the Study were retained for the development of the lower and upper bounds of the range of probable values. In particular, the high-end of the range was set to approximate the payload that would put a truck's gross vehicle weight at the maximum allowed on U.S. roads without requiring a special overweight permit.

In the model, the percentage of empty trucks in total truck traffic is used to derive estimates of total trucks, from estimates of loaded trucks. The values are based on statistics on the number of incoming (i.e., southbound) empty and loaded truck containers at each Montana port, reported in the North American Transborder Freight database maintained by BTS.

Oil and gas extraction has been – and is expected to be – a major driver of economic growth in the region, in particular oil sands in Alberta (Chapter 3). Continued expansion of the sector, however, depends crucially on future oil prices, and whether prices will remain above a threshold set by energy specialists at $75 to $100 a barrel (for the Brent Crude benchmark). This is also true, to some extent, for oil exploration and development in Montana. Along with stimulating economic growth and commodity flows in a variety of sectors, increased oil-related activity would generate local and cross-border goods movement, in particular by truck. The oil price projections (in dollars per barrel) used in the forecasting tool were derived from the 2013 Energy Outlook prepared by the U.S. Department of Commerce, Energy Information Administration.

Table 21 also includes the percentage distribution of commercial autos and trucks across all ports considered in Phase 1 of the study. Adjustments are made, within the model, to ensure that the shares sum-up to 100 percent (at run-time, within each iteration of the traffic simulation). Finally, the table provides a distribution of traffic by trip purpose. It is used in the model to estimate commercial auto traffic from estimates of non-truck AADT. The distribution is based

[23] A short ton (or simply a ton, in the United States) is equivalent to 2,000 pounds. It is different from the metric ton used more commonly in other parts of the world (and equivalent to 1,000 kilograms or 2,205 pounds).

partly on the results of a recent survey of passenger vehicles at five land POEs between Western Washington State and British Columbia[24].

Table 21: Ranges of Probable Values for Transportation-Related Input Variables

Variable	Low	Most Likely	High	Sources
Average Value per Ton, by Industry				
Agriculture	$1,648	$1,768	$1,961	BTS North American Transborder Freight Database (2013) FHWA Freight Analysis Framework (2013)
Construction	$1,329	$1,774	$2,123	
Manufacturing	$1,536	$1,955	$2,323	
Mining and Oil Extraction	$313	$379	$498	
Wholesale and Retail Trade	$4,953	$5,994	$6,784	
Remainder	$9,670	$9,996	$10,770	
Truck Traffic				
Average Payload, short tons per truck	15	20	30	FHWA Freight Analysis Framework (2013), with adjustments from MDT (2010)
Percent of Empty Trucks	14%	19%	25%	BTS North American Transborder Freight Database (2013)
Oil Prices, in U.S. Dollars per Barrel				
2012	$92	$92	$92	EIA (2013)
2020	$67	$104	$153	
2035	$71	$143	$211	
Distribution of Trucks across POEs				
Sweet Grass	75.3%	79.7%	83.7%	Traffic Count Data provided by MDT, March 2013 MDT(2013b)
Wild Horse	2.1%	2.6%	3.3%	
Willow Creek	0.0%	0.5%	0.6%	
Turner	0.4%	1.5%	2.5%	
Morgan	1.2%	1.6%	2.0%	
Opheim	0.1%	0.7%	1.7%	
Scobey	0.2%	2.2%	3.7%	
Whitetail – CLOSED	0.0%	0.0%	0.0%	
Raymond	8.1%	10.6%	13.3%	
Distribution of Autos across POEs				
Sweet Grass	61.5%	70.7%	77.2%	Traffic Count Data provided by MDT, March 2013 MDT(2013b)
Wild Horse	5.1%	6.2%	8.6%	
Willow Creek	1.1%	1.9%	2.4%	
Turner	1.9%	3.5%	7.5%	
Morgan	2.1%	2.5%	3.3%	
Opheim	1.2%	2.0%	2.9%	
Scobey	2.5%	3.3%	4.2%	
Whitetail – CLOSED	0.0%	0.0%	0.0%	
Raymond	6.1%	8.9%	11.0%	
Distribution of Autos by Trip Purpose				
Business Related	3%	5%	6%	WCOG (2013), page 10 and FHWA (2009)
Shopping (including for Gas)	19%	32%	45%	
Recreation or Vacation	10%	22%	35%	

[24] Only commercial trip purposes (as defined earlier in this report) are shown in the table, so the figures do not add up to 100 percent. The balance is comprised of personal trips, including family visits and commuting trips.

5.5 Use of Freight Projections from FAF

FHWA's Freight Analysis Framework (FAF) provides 30-year forecasts of freight shipped to, from, and within the United States. Forecasts are available by state or region (of origin and destination, entry or exit), mode and commodity. New versions of the FAF are created every five years, after each Economic Census. The version used for this report (FAF3) is based on data from the 2007 Census. Forecasts of trade volumes with Canada (i.e., imports and exports, in tons) by truck, through Montana ports, were obtained from the online FHWA FAF Data Tabulation Tool (at http://faf.ornl.gov/fafweb/Extraction0.aspx, last accessed January 8, 2014). As noted above, these projections were used to validate the results produced with the ICED 1 model described in Section 5.3.

Forecasts from FAF present a number of limitations, which are summarized as follows in the FAF3 User Guide:

> *"FAF forecasts are a reasonable extrapolation of current trends, but do not reflect major shifts in the national economy, future capacity limitations, or changes in transportation costs and technology. An extensive system of economic models is used to convert national consumption patterns and foreign trade into purchases among industries and then into volumes of commodities reflected in those purchases. Current percentages carried by each mode for each commodity are then applied to the forecasted mix of commodities to obtain future modal shares of freight movement."* FHWA (2012), page 5

Average annual growth rates in total imports and exports by truck through Montana ports are shown in Table 22. A breakdown by commodity can be found in Appendix C.

Table 22: FHWA Forecasts of Average Annual Growth Rates in Imports and Exports by Truck through Montana Ports, 2015 – 2040

	2015	2020	2025	2030	2035	2040
Import Volumes by Truck	3.7%	2.7%	3.1%	2.9%	2.7%	2.9%
Export Volumes by Truck	4.5%	5.8%	4.7%	3.8%	3.4%	3.7%

Note: Average annual growth rates during the period ending in the year used as column header (e.g., imports are expected to grow by 3.7 percent a year between 2012 and 2015; by 2.7 percent between 2015 and 2020; etc.).
Source: FAF 3 (FHWA (2013))

5.6 Description of Output Variables

The variables produced by the forecasting tool as output are focused on commercial traffic related to Canadian economic development. Commercial traffic is further broken down between truck traffic and commercial auto traffic, where commercial auto traffic is defined as traffic for tourism or shopping purposes, as well as on-the-clock business-related trips.

The forecasts are presented by:

- Forecast year – from 2012 through 2032;
- Type of traffic – total, truck and commercial auto; and
- POE and connecting highway(s) – as noted earlier, while closely related, volumes and growth patterns vary between POEs and their connecting highways as POE volumes are typically a fraction of traffic volumes on connecting highways.

As in Phase 1 of the study, results from the models are expressed as ranges of probable outcomes (or probability distributions), characterized by a most likely forecast, as well as a low and a high forecasts, representing the bounds of an 80 percent confidence interval – the interval within which the true, but unknown future traffic level would be found 80 percent of the time (if we were to repeat the forecasting exercise multiple times).

The most likely traffic forecast is represented by the 50th percentile (or median) of all probable outcomes estimated by the model. The low forecast is estimated as the 10th percentile of all simulated traffic levels, and the high forecast as the 90th percentile of all simulation results. In other words, the low forecast is selected so that there is only a 10 percent probability that future, actual traffic will be lower; and the high forecast is set so that there is only a 10 percent chance that future traffic levels will be greater.

6 QUANTIFICATION OF IMPACTS

The traffic forecasting tool presented in Chapter 5 was designed to simulate the effects of economic development (by industry) on cross-border trade and traffic levels along selected highways in Northern Montana. Through the use of adjustment factors, the tool can also be used to simulate the effects of various operational and policy changes.

This chapter summarizes the research undertaken to assess the impacts of:

- Extended hours of operation at selected ports;
- The abolition of the Canadian Wheat Board as a single-desk seller; and
- Harmonization of truck size and weight regulations between the U.S. and Canada.

Each of these changes is addressed below, in a separate section. The sections include a few introductory remarks, a summary of existing research and/or available evidence, and a table summarizing the assumptions used in the tool to prepare the projections presented in Chapter 7.

6.1 Impacts of Extended Port Service Hours

Three land ports of entry in Montana are currently open 24 hours a day, seven days a week: Roosville, Sweet Grass and Raymond (identified with a star in Figure 62). All three ports are also commercial ports as opposed to permit ports[25]; which are defined as follows by U.S. Customs and Border Protection (CBP 2010):

- Commercial ports are POEs where any admissible commercial merchandise, with possible limited exceptions, can be entered and released;
- Permit ports typically have low cargo volume and do not have the infrastructure to off-load cargo for physical examinations. Commercial shipments that require a formal entry must be pre-approved or permitted by the Area Port Director to be allowed to enter through the port[26].

In addition, Piegan – a permit port located about 60 miles west of Sweet Grass – operates with extended hours, from 7:00am to 11:00pm, 7 days a week, all year long.

[25] Roosville became a commercial port in November 2009, but was already open 24 hours a day, 7 days a week before that.

[26] Permit requests are normally submitted by a customs broker. Not all commercial shipments require a permit. Shipments of merchandises not exceeding $2,500 can be entered using informal entry procedures.

Figures F-1 and F-2 in Appendix F provide some information on the distribution of truck and passenger vehicle crossings by time of day, at the 24-hour Sweet Grass POE. The information is only indirect, as average wait times depend on both arrival rates *and* port processing capacity (i.e., number of lanes open and average vehicle processing rate per lane). Nonetheless, changes in average delays are indicative of the willingness to cross (southbound) over the course of a day.

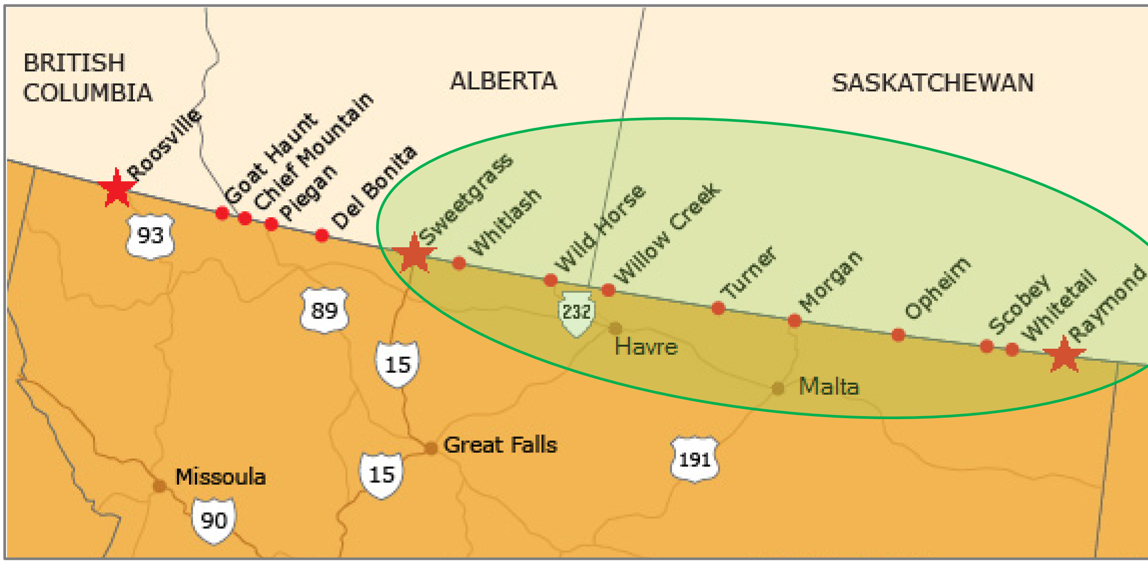

Figure 62: Ports of Entry in Montana

Note: The ports of entry considered in the ICED 1 Study are highlighted in green; Commercial ports – within or outside the Phase 1 study area – are identified with a red star
Source: Adapted from TBWG (2013)

Operating conditions at the ports considered in the ICED 1 Study are summarized in Table 23, with the ports of Wild Horse and Morgan (the focus of Phase 2) highlighted in grey. Service hours on the Canadian side are generally the same[27]. Port types are also generally the same, with the exception of Regway in Saskatchewan (opposite Raymond) which – as a Designated Export Office – does not provide the full range of commercial services.

Sweet Grass and Raymond are the only two 24-hour ports within the Phase 1 study area. They are located at the extreme western and eastern ends of the area, respectively, and separated by a straight-line distance of about 340 miles. The absence of ports with extended service hours between these two facilities is considered (by some) as a constraint for the growth and/or timing of cross-border traffic. Thus, most stakeholders interviewed in Phase 1 expressed a desire to have at least one (and possibly two) additional POEs with extended service hours (24-hour operations or extension of operations into the morning and evening hours, up to 16 or 18 hours a day)

[27] The dates at which ports switch from winter hours to summer hours differ slightly. At Wild Horse for example, winter hours end 03/31on the Canadian side, and 05/14 on the U.S. side.

within the area. Stakeholders also stressed the importance of infrastructure improvements along connecting highways, to take full advantage of the extension(s).

Stakeholders interviewed in Phase 2 also highlighted a number of constraints resulting from limited service hours. These are summarized, along with other research findings, in Section 6.1.1.

Table 23: Operating Conditions at POEs within the ICED 1 Study Area

Border Crossing	Port Type	Operating Hours (as of November 2013)	2008		2011		2012	
			AADT	Percent Trucks	AADT	Percent Trucks	AADT	Percent Trucks
Sweet Grass	Commercial	24 HR	1,890	38%	2,650	31%	1,790	45%
Whitlash*	Permit	9 AM–5 PM	10	90%	40	23%	60	35%
Wild Horse	Permit	8 AM–9 PM (05/15–09/30) 8 AM–5 PM (10/01–05/14)	130	19%	170	15%	160	13%
Willow Creek	Permit	9 AM–5 PM	40	0%	30	13%	30	13%
Turner	Permit	8 AM–9 PM (06/01–09/15) 9 AM–6 PM (09/16–05/31)	60	7%	50	8%	130	7%
Morgan	Permit	8 AM–9 PM (06/01–09/15) 9 AM–6 PM (09/16–05/31)	50	30%	70	17%	70	24%
Opheim	Permit	8 AM–9 PM (06/01–09/15) 9 AM–6 PM (09/16–05/31)	50	2%	40	3%	50	24%
Scobey	Permit	8 AM–9 PM (06/01–09/15) 8 AM–6 PM (09/16–05/31)	60	7%	80	13%	70	20%
Whitetail**	CLOSED JANUARY 2013							
Raymond	Commercial	24 HR	250	35%	280	48%	290	39%
Great Falls	Service	8 AM–5 PM (Monday-Friday)	n/a	n/a	n/a	n/a	n/a	n/a

*Notes: * The POE at Whitlash is the centralized location for processing vehicle exports in the Great Falls Area Port. A new inspection facility was open at the site in January 2013. ** The POE at Whitetail was closed in January 2013, following the Canada Border Services Agency's decision to close the POE opposite Whitetail at Big Beaver, Saskatchewan, and a subsequent review by CBP.*

Sources: CBP (2013a), MDT (2013a), MDT (2013b)

6.1.1 Summary of Existing Research and Evidence

The findings presented in this section were derived from a variety of sources and documents, including survey results communicated by CBP, research reports, and interviews with industry representatives and regional stakeholders.

U.S. CBP Port of Sweet Grass Commercial Driver Survey, 2013

This survey was conducted at the Port of Sweet Grass during different blocks of time over a four-day period (June 25, June 27, July 3 and July 4, 2013). The survey took 24 hours and each hour of the day was covered during the survey. Only two questions were asked, both in relation to using the Port of Wild Horse as an alternative. A total of 220 responses were collected. They are summarized in the tables below.

Question #1: Have you used the Port of Wild Horse in the last 10 years?

Responses	Count	Percent of Total
Yes	26	11.8%
No	194	88.2%
Total	**220**	**100.0%**

Source: CBP (2013b)

Question #2: Why not use the Port of Wild Horse for this trip?

Responses	Count	Percent of Total
Ineligible commodities: require other Federal Agency inspection	21	9.5%
Enclosed van / trailer that would require off-loading for inspection	62	28.2%
Have not applied for port permit / unaware of requirements to cross at Wild Horse	15	6.8%
Distance to destination / port of lading out of way	115	52.3%
Road conditions north and / or south of port of Wild Horse	6	2.7%
Limited crossing hours	1	0.5%
Other	0	0.0%
Total	**220**	**100.0%**

Source: CBP (2013b)

Based on these results:

- Only about 12 percent of commercial drivers crossing at Sweet Grass (southbound) had used the Port of Wild Horse before;
- The two most frequent reasons for not using Wild Horse were in relation to the location of the port itself (Distance to destination / port of lading out of way) and to potential inspection requirements (Enclosed van / trailer that would require off-loading for inspection);

- Less than 3 percent of respondents cited "*Road conditions*" as a reason for not using Wild Horse; and

- Less than 1 percent (0.5 percent, or 1 out of 220 respondents) cited "*Limited crossing hours*".

This last result suggests that extending service hours at Wild Horse would only divert a small portion of southbound trucks from Sweet Grass to Wild Horse. Extrapolating the 0.5 percent (1/220) estimate to the total number of incoming trucks at Sweet Grass in 2012 (132,340 according to BTS 2013) would lead to approximately 600 additional vehicles at Wild Horse, or about 35 percent of the volume observed at the port in that year (1,620)[28]. Given the relatively small sample size, however, this estimate should be interpreted with caution.

U.S. CBP Port of Wild Horse Commercial Driver Survey, 2011

This survey was conducted at the Port of Wild Horse between April 7 and May 31, 2011. Each commercial truck driver (crossing southbound) was surveyed once, regardless of the number of crossings they made during the survey period. A total of 20 commercial drivers were surveyed. Six questions were asked in total, including whether drivers would use the port during extended hours, as follows:

Question: If this crossing were open 24 hours, would you cross between 9 PM and 8 AM?

Responses	Count	Percent of Total
Yes, in summer only*	6	30.0%
No	14	70.0%
Total	**20**	**100.0%**

** All 20 truck drivers stated that they would not use the port between 9PM and 8AM in the winter.*
Source: CBP (2011)

The other five questions pertained to vehicle and crossing attributes. Responses to these questions indicate that among the 20 respondents:

- 17 were driving a loaded vehicle, 3 an empty vehicle;

- 17 vehicles had been loaded in Alberta, 3 at another location;

- All had crossed at Wild Horse before;

[28] These estimates were derived as follows: 132,340 x (1/220) = 602 and 602 / 1,620 = 37.1%; where 132,340 and 1,620 are the total numbers of southbound trucks at Sweet Grass and Wild Horse respectively, in 2012.

- 15 were using the port monthly (1 to 3 times a month) and 5 weekly (once per week or more); and
- All had Montana as their destination.

On the basis of these results, about a third (30 percent) of incoming trucks that used the Port of Wild Horse in 2011 would change their crossing time if they were able to do so, but only in the summer. This suggests that these vehicles would benefit, in one way or another, from the extension of service hours in summer months.

U.S. CBP Port of Wild Horse Passenger Vehicle Survey, 2011

This survey was administered over a two-month period during the spring of 2011. Six questions were asked to individuals crossing at the Port of Wild Horse in the southbound direction. Travelers with multiple crossings were surveyed only once during the survey period. A total of 1,161 travelers were surveyed. One of the questions asked was in relation to extended service hours at the port, as follows:

Question: If this crossing were open 24 hours, would you cross between 9 PM and 8 AM?

Responses	Count	Percent of Total
Yes	45	3.9%
No	1,116	96.1%
Total	**1,161**	**100%**

Source: CBP (2011)

Among the 1,161 respondents:

- 86 percent were coming from Alberta, 14 percent from other provinces;
- All were traveling for pleasure (no one was traveling for business);
- 558 were going to Havre (or a destination within 50 miles of Havre), 47 to another city in Montana;
- 95 percent had crossed at Wild Horse before; and
- 400 were crossing at Wild Horse weekly (once per week or more), 200 monthly (1 to 3 times a month) and 5 annually.

These results suggest that only a small fraction (less than four percent) of passenger vehicles at Wild Horse would change their crossing time if service hours were extended.

GTS Group International (2008)

This 2008 study by GTS Group International, a consultancy headquartered in Washington DC, looks at the economic impacts of upgrading the crossing at Wild Horse to a 24-hour full-service commercial port[29]. To support the analysis, the report provides "*indications*", as to what commercial traffic can "*logically and potentially*" be diverted to the upgraded port (page 11). The report concludes:

> *"From conversations with exporters in southeastern Alberta, it is known that the estimated 3,200 truckloads moving through Wild Horse (in 2006) could at least quadruple if Wild Horse was open 24 hours, as it would greatly improve transportation efficiencies and costs for southeastern Alberta importers/exporters"* (page 11).

The authors note that this additional traffic at Wild Horse would include: i) commercial traffic from Alberta crossing east of Sweet Grass, including traffic destined to eastern Montana, North Dakota, U.S. Midwestern and southeastern states, and the U.S. eastern seashore; ii) traffic from Wyoming, Colorado, New Mexico and Texas diverting from I-15 to the "*shorter and more direct routing*" through Wild Horse into Alberta; and iii) traffic between Alberta and eastern Montana having to use Sweet Grass because of "*inconvenient*" service hours at Wild Horse (page 11).

From a broader perspective, the report also stresses the need to create a second, eastern corridor between the United States and Alberta (in addition to the I-15 / Highway 2 corridor through Sweet Grass / Coutts) to help accommodate future traffic growth, in particular in relation to oil sands development in the Canadian province.

Overall, this report suggests a potentially large increase in commercial traffic at Wild Horse (+300 percent, or about 60 additional trucks per day[30]), but it is unclear how much of this increase would be attributable to extended service hours alone, as opposed to extended hours plus conversion to a commercial port.

Barkey (2008)

This study, by Dr. Patrick Barkey of the University of Montana (Bureau of Business and Economic Research), also examines the impacts of upgrading the crossing at Wild Horse to a 24-hour commercial port. Projected changes in traffic at the port are based on "*reasonable, conservative assumptions about likely traffic impacts, based on previous studies and the experiences of other 24-hour ports*" (page 13). Specifically, it was assumed that truck volumes at Wild Horse would quadruple as a result of its proposed new status. This assumption was based

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[29] This would be true on both sides of the border, with the Port of Wild Horse in Alberta converted from a "Designated Export Office" operating 9 to13 hours a day to a 24-hour, full-service "Designated Commercial Office."

[30] There were 21 trucks per day on average at Wild Horse in 2012 (MDT 2013a).

on an earlier, 2007 version of the GTS International study discussed above; as well as on observed traffic volumes at Roosville and Raymond (both open 24 hours a day, 7 days a week).

The author also argues that visitor volumes would grow by 30 percent if the port were upgraded to a 24-hour facility. This estimate was based on time-of-day crossing data collected at the Pacific Highway port of entry, between Washington State and British Columbia. Those data indicate that about a third of crossings (30 percent of the total) take place in the evening hours, when the Port of Wild Horse is closed. The increase in visitor volumes at Wild Horse was extrapolated directly from this finding.

Stakeholder Interviews

Interviews with development and industry experts in northern Montana, Alberta and Saskatchewan revealed a mix of opinions regarding the effects of extended port service hours. These opinions are summarized below.

- Agriculture
    - One respondent noted that the ports at Sweet Grass, Turner, and Raymond see a lot of traffic; and that more activity could be seen at Wild Horse. For this respondent (another port with) 24-hour service is not necessary, but more efficient paperwork and processing are needed. Service hours between 6:00 am to 5:00 pm would be fine.
    - A respondent indicated that ports of entry are not really a barrier or constraint, but simply part of the cost of transportation, which is a function of proximity to local elevators and other costs associated with shipping commodities across the border. The respondent was uncertain as to whether adjusting service hours would impact farming.
- Energy
    - One respondent thought that (limited) service hours were an issue. He indicated that there had been some cases where trucks got stuck at the border because the port was closed.
    - A respondent pointed out that drilling rigs and hydraulic fracturing crews mostly use Sweet Grass; and that it is generally difficult to use other ports because some equipment and supplies (like explosives) are only allowed at certain crossings.
    - An interviewee felt that longer operating hours would provide more flexibility, especially for emergency or spur-of-the moment travel.
- Tourism

    - One respondent thought that port service hours might not significantly affect visitation because people generally plan around them. People will make the trip no matter what the operating hours are. On the other hand, widening US Highway 191 (to Morgan) could make a difference.

    - Another respondent thought that port operating hours were a definite limitation. He pointed out that travelers sometimes have to leave a day earlier (or later); and that people occasionally miss the window during which a port is open.

- Economic Development

    - One interviewee thought that more people might use the port at Wild Horse if it had extended service hours; but that infrastructure improvements are needed to see the full benefits of the extension.

    - Another respondent pointed out that extended service hours would give more options to rural residents who rely on the border crossing for convenience and economic opportunities.

- Transportation

    - Some respondents noted that smaller ports do not have the critical mass for longer service hours. Others mentioned that having more 24-hour ports would reduce freight traffic through Sweet Grass.

    - One respondent indicated that having another 24-hour port in eastern Montana would be convenient and allow for easier planning (e.g., less idling, diversion, or waiting for border to reopen).

    - Another interviewee mentioned that they did not use the crossings at Wild Horse and Morgan, because the ports do not offer Electronic Data Interchange (EDI) capabilities. And increasing service hours at the ports would have no impact on their business.

6.1.2 Assumptions Used in Forecasting

The ICED 1 study established that extending service hours at a port would have a number of different effects, including: i) shifting of crossing times to the additional service hours (holding the total number of crossings at the port constant); ii) diverting border crossings from other ports (in particular from those already open 24 hours a day); and iii) inducing new cross-border trips. Considering all these effects jointly, it was assumed that traffic at the port(s) where service hours are extended would increase by 5 to 30 percent, with a most likely impact of +15 percent. This confidence interval was determined from existing research on induced travel (FHWA 1998), and from discussions with regional stakeholders and subject matter experts during a risk analysis workshop (MDT 2010).

Table 24 summarizes the assumptions used in this phase of the study to generate the traffic forecasts presented in Chapter 7. Changes are expressed in percentages and in terms of additional vehicles per day (on the basis of traffic levels observed in 2012). In all cases, it was assumed that the port(s) would be open 16 hours a day, 7 days a week, all year long, to both commercial trucks and passenger vehicles, in both directions (i.e., on the U.S. side and the Canadian side of the border). It was also assumed that no other changes would occur at the port(s); in particular the ports would not be upgraded to commercial ports.

Table 24: Impacts of Extended Service Hours at the Wild Horse and Morgan Ports of Entry

	Most Likely	Low	High
Extended Service Hours at Wild Horse			
Change in Daily Truck Traffic at the Port	+30% (+6 trucks)	+10% (+2 trucks)	+60% (+13 trucks)
Change in Daily Auto Traffic at the Port	+10% (+14 autos)	+5% (+7 autos)	+30% (+42 autos)
Extended Service Hours at Morgan			
Change in Daily Truck Traffic at the Port	+30% (+5 trucks)	+10% (+2 trucks)	+60% (+10 trucks)
Change in Daily Auto Traffic at the Port	+10% (+5 autos)	+5% (+3 autos)	+30% (+16 autos)

Notes: Estimates of daily vehicles are rounded to the nearest integer value
Source: HDR Assumptions, based on CBP survey results and evidence presented in literature

The medium estimate for trucks (+30 percent) was derived from the results of the 2013 CBP commercial driver survey at Sweet Grass. The low estimate (+10 percent) was derived by assuming that only a third of that increase would be realized. The upper end of the range (+60 percent) was based on a combination of survey findings and professional judgment. Specifically, the results of the 2013 CBP commercial driver survey were used to derive the upper bound of an 80 percent confidence interval using the following formula:

$$\hat{p} + 1.28 \times \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

Where p is the percentage of respondents at Sweet Grass who reported not using Wild Horse because of limited service hours (0.5 percent); n is the sample size (220); and 1.28 is a statistical parameter representing the level of confidence desired (80 percent here). The formula leads to an upper bound of about 1.0 percent, which when applied to 2012 incoming truck volumes at Sweet Grass (132,340) represents an addition of 1,320 trucks annually at Wild Horse, an increase of about 80 percent. This estimate was reduced to 60 percent to account for the limited extension of service hours assumed in this study (16 hours instead of 24)[31].

The impacts of extended service hours on auto traffic are assumed to be lower. This is based, partly, on the results of the 2011 CBP passenger vehicle survey (which suggest a relatively limited interest in crossings beyond the port's summer service hours) and statements from industry representatives. The high end of the distribution (+30 percent) is based on assumptions developed in Phase 1, through discussions with regional stakeholders and subject matter experts (upper bound, for all vehicle types).

6.2 Impacts of Canadian Wheat Board Reforms

The Canadian wheat and barley markets have recently become more competitive with the dissolution of the Canadian Wheat Board (CWB). For over 75 years, grain farmers in Alberta, Saskatchewan, Manitoba, and parts of British Columbia were required to sell all output to the CWB. The CWB lost its monopsony power in August 2012 and now operates only as a marketing organization.

Prior to 2012, the CWB would receive grain deliveries from farmers in exchange for an initial payment based on expected grain prices as well as a final payment at the end of the season based on real grain prices. The CWB also conducted quality control, negotiated with global customers, and coordinated transportation of Canadian grain. Proponents of the CWB argue that it gave small farmers market power and provided some opportunities for economies of scale. Critics believe it added a costly layer of bureaucracy to the grain market, reduced market efficiency, and potentially discouraged innovation.

6.2.1 Summary of Existing Research

Previous academic research into competitive Canadian grain markets produced mixed results, although most studies generally concluded that Canadian export volumes to the U.S. would stay constant or increase.

Koo et al. (2004) used a partial equilibrium model to estimate what might happen if the CWB were removed. In general, Canadian production costs for grain are lower than those of the U.S. due to lower land and chemical costs. However, Canadian farmers face higher transportation costs to offshore markets than their American counterparts. Empirical analysis showed that Canadian wheat exports to the U.S. might increase as Canadian farmers would be able to sell directly to grain elevators in the northern U.S. The U.S. would then export more of its domestic wheat crop abroad, to other countries besides Canada. Koo notes that this may be a short-run effect as Canadian transport firms might be incentivized to improve efficiency.

[31] The CBP survey referred to "Limited Service Hours", which could have been interpreted by commercial drivers as "Less than 24 hours."

Dong and Steigert (2003) found that U.S. imports of Canadian malting barley could increase as much as 25,000 tons in absence of the CWB. They model barley price and quantity under a price discriminating CWB (with a goal of maximizing returns to Canadian farmers), and then compare the outcomes with the market equilibrium price and quantity under four alternative market structures. In general, Dong and Steigert found that there was higher "*consumer welfare*" (i.e., prices were lower and larger quantities were consumed) in more competitive market scenarios, and that removal of the CWB would result in the U.S. importing more Canadian barley at a lower price.

Johnson (1999) examined the trade and welfare effects of a single desk seller of Canadian barley. Johnson estimated that under a single desk seller market structure, 542,000 metric tons of barley would be exported from Canada to the U.S., for a total revenue estimate of C$67.8 million. Under a more competitive market structure, 543,000 metric tons (+0.2 percent) of barley would be exported at a total revenue of C$66.1 million (-2.5 percent). He determined that a single desk seller would produce the highest revenue for farmers if the seller could effectively price discriminate and have minimal marketing costs. However, the CWB did not disclose price data, so it was not possible to evaluate its ability to price discriminate. Also, Johnson found that U.S. barley imports were negatively related to Canadian marketing costs. If Canadian farmers can be more cost-effective at marketing than the CWB, overall exports should increase.

Overall, without the CWB, the Canadian grain markets are expected to become more competitive globally. Small farmers now have to negotiate their own selling prices. There is more incentive to innovate, although some market consolidation is to be expected as some small farmers will be unable to market and sell their grain at a profit. Other farmers may shift to producing specialty grains or to more value-added industries like pasta factories and flour mills.

In 2013, Canada had its largest wheat crop in more than twenty years at 30.6 million tons, exporting about two-thirds. Some varieties of wheat traded for lower than their U.S. counterparts, allowing Canadian exports to be competitive with the U.S. in new markets like the Philippines, Latin America, and Africa. Canadian wheat exports to the U.S. were also strong in 2013. Through August 2013, Canada exported over $646 million into the U.S., an increase of nearly 40 percent over the same months in 2012.

However, at this stage, it is not clear how truck traffic between Canada and the U.S., specifically Montana, will change as a result of more competitive grain markets in Canada. In the U.S., over 60 percent of wheat is transported by rail (AAR 2013). In Canada, twice as much grain is transported by rail than truck. Barges on the Mississippi River to ports in the Gulf of Mexico are another alternative which is price-competitive with trucks. Therefore, any changes in trade patterns will likely be muted in terms of overall truck volumes. Regionally, indirect effects on cross-border traffic could include changes in the demand for fertilizer and other agricultural inputs (e.g., machinery and equipment), which may result from improvements in Canada's relative price competitiveness in international grain markets. These effects however are likely to be small, and cannot be readily quantified.

These broad conclusions were generally confirmed during the Phase 2 interviews. Interviewees in the Agriculture sector were asked the following questions: *"Do you expect that the reform of the Canadian Wheat Board will create significant changes in the wheat industry in Canada? Or impact trade flows and traffic volumes between the US and Canada?"* (Appendix A). They provided the following answers:

- No major changes have happened since the abolition of the CWB. Delisting hasn't made a major change, as transportation costs are a more prominent issue for the importation or exportation of wheat. Elevation pricing is about the same on both sides of the border.
- The reform of the CWB will create a North American market, but ultimately the hauls (the origins and destinations) will be based on least-cost considerations for farmers to get their grain to an elevator.
- There is a perception in the industry that this could be the "*perfect storm*" for lowering crop prices with: i) the removal of the CWB allowing more wheat to go south, and ii) new and larger elevators in Montana, allowing lower shipping costs and attracting more demand. One respondent, however, pointed out that it is unlikely that a lot of grain would come across the border because trucking costs to get to the elevators in Montana are too high.

6.2.2 Assumptions Used in Forecasting

The research summarized above suggests that CWB reforms might increase Canadian exports of wheat and barley. As a result, truck traffic across the Montana – Canada border may change. This change would be due primarily to Canadian farmers selling larger amounts of grains to elevators in Montana (Koo et al. 2004), and to variations in the volume of trade in agricultural inputs (e.g., fertilizer, seed, machinery). The magnitude and duration of these effects are unknown, but are expected to be small.

In the model, a uniform probability distribution with a minimum value of -10 percent and a maximum value of +10 percent was applied to the total number of commercial vehicles (generated in the Agriculture sector) passing through the border and/or traveling along the US 191 and S-232 corridors. In both corridors, this corresponds to a variation of about plus or minus one vehicle per day.

6.3 Impacts of Truck Size and Weight Limits Harmonization

Harmonization is the process of setting compatible truck size and weight regulations between two geographic areas. The need for harmonization between the U.S. and Canada has been recognized for many years (Harrison 1999) but progress has been slow. The section below provides a brief summary of the issues and discusses the potential traffic impacts of standardization.

6.3.1 Summary of Existing Research

Each of Canada's ten provinces and three territories used to be able to set its own truck size and weight restrictions. In the 1970s, Canada began to standardize these requirements through negotiations with provinces. The emerging national standards were also based on research into performance and safety issues, as well as infrastructure costs. Canada began to implement these harmonized standards in the mid-1980s through a national Memorandum of Understanding (MOU). Length, weight and performance restrictions were detailed for eight different vehicle configurations as part of the MOU. In Canada, a truck with two trailers can weigh up to 137,800 lbs. and be up to 82 feet long on National Highway System (NHS) roads, while a truck with a single trailer has a maximum gross weight of 102,500 lbs. and a length limit of 75 feet[32]. These restrictions apply to Canadian NHS roads only, and allow for exceptions on local roads. It is estimated that approximately 95 percent of truck trips in western Canada in 1999 were taken by trucks with MOU configurations[33].

In the United States, states were solely responsible for setting truck size and weight limits prior to the Federal-Aid Highway Act of 1956. States with higher limits than the 1956 federal limits were allowed to retain them under a grandfather clause. The Surface Transportation Assistance Act of 1982 sets minimum size standards for trucks and expands the highway network on which Federal width provisions apply (FHWA 2004). Finally, the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 limits the weight of double trailers to 80,000 lbs. and imposes a maximum length of 65 feet[34]. Federal weight limits were influenced by pavement and safety concerns.

Many western states allow for longer, heavier trucks (Longer Combination Vehicles, or LCV) than permitted under ISTEA due to the grandfather clause of the 1956 federal law. ISTEA also prohibited states from changing the weights and dimensions outlined in the grandfather clause: the Act froze the restrictions *"actually and lawfully"* in effect in a State in 1991. As a result, effective truck size and weight restrictions may differ between neighboring states (Table 25).

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[32] Some provinces or territories have secondary highways with lower standards, and some have reduced loads during spring thaw (Schulman 2003). Thus, the maximum gross vehicle weight on Saskatchewan's secondary highways is 120,100 lbs. (for an 8-axle double-trailer truck), against 137,800 lbs. on primary highways. The Province also has generally higher weight limits in the winter.

[33] In 2010, the National Cooperative Highway Research Program (NCHRP) estimated the economic benefits of truck harmonization in Canada. NCHRP found that harmonizing size restrictions generated annual benefits of $204 million in 1992, $260 million in 1997, and $320 million in 2002 for operations on the Canadian NHS. NCHRP estimated that benefits would double if operations on other highways were considered.

[34] Thus, trucks in Canada can weigh about 70 percent more than those in the U.S., when measured by the difference between the U.S. Federal gross weight limit of 80,000 lbs. and the largest allowable weight of 137,800 lbs. in the Canadian MOU (Schulman 2003).

Table 25: Length and Weight Requirements of Vehicles Subject to the ISTEA Freeze, in Montana and Neighboring States

State	Tractor Double-Trailer		Tractor Triple-Trailer		Other Vehicles* Length (feet)
	Length (feet)	Weight (lbs.)	Length (feet)	Weight (lbs.)	
Montana	93	131,060 137,800 (I-15@Shelby)	100	131,060	88 – 103**
Idaho	95	105,500	95	105,500	78 – 98**
North Dakota	103	105,500	100	105,500	103
South Dakota	100	129,000	100	129,000	73 – 78**
Washington	68	105,500	Not allowed	Not allowed	68
Wyoming	81	117,000	Not allowed	Not allowed	78 – 85**

Source: FHWA (2004)
*Notes: The numbers represent either the maximum cargo-carrying length from the front of the first cargo unit to the rear of the last cargo unit, or the maximum gross weight that a vehicle can carry when operating on the Interstate System; * Other vehicles may include a truck towing one trailer, or a semitrailer and trailer; or an automobile/boat transporter; ** These values represent the range of lengths allowed for the different vehicles covered by the regulation.*

In Montana, the governing gross vehicle weight limit is 131,060 pounds. But the State also has a 137,800-pound limit for the section of I-15 between Shelby and the Canadian border. This is allowed under a special provision of ISTEA, so that vehicles (meeting the specifications of an interprovincial Canadian agreement) can access an intermodal facility at Shelby.

More generally, as noted in U.S. DOT (1995), there are a *"myriad"* of different size and weight regulations governing trucking across the western border with Canada (page ES-2). In addition to the vehicle length and gross vehicle weight requirements highlighted in Table 25, different limits and regulations apply to vehicle height[35], number of axles and axle spacing, tractor wheelbase length, tire load, axle weight, and steering axle weight (in Canada)[36].

[35] Most Western Border States (including Montana) allow 14-foot high vehicles, which is 6 inches more than in the western provinces. There is no U.S. Federal vehicle height requirement for commercial vehicles.

[36] In addition, size and weight limits may vary by corridor, or even by industry. In Alberta, for example, designated highways along the "High Load Corridor" can accommodate loads up to nine meters (29 feet) high; and the "Log Haul Program" allows higher than legal weights and dimensions for qualified mills (Alberta Ministry of Transportation 2013).

These complex regulations have led to the use of many different truck configurations along and across the border[37]; with some specifications unique to the region (U.S. DOT 1995).

U.S. DOT (1995) also notes that because of these different regulations, trucking companies have adopted a series of measures to ship freight across State lines and the Northern border. Depending on the jurisdictions being crossed and the highway classes used, trucks may: *"(1) be stretched or contracted using adjustable drawbars; (2) have axles raised, lowered, or re-positioned; (3) have fifth wheels re-positioned; (4) have tires removed or added; or (5) have loads modified or shifted"* (page ES-4).

If the U.S. and Canada fully harmonized truck size and weight standards and the U.S. allowed a higher gross weight on NHS roads, a number of changes would follow. Canadian history suggests that U.S. trucking companies would begin using these larger configurations almost immediately in order to reduce the number of trips and save costs. NHCRP estimates that the number of truck trips could decline by 10 to 15 percent.

A 2004 report by the U.S. DOT examined the effects of harmonizing truck size and weight restrictions in thirteen western states[38]. Specifically, the report assesses the impacts of lifting the ISTEA freeze, and expanding the operations of LCVs, assuming a maximum allowable gross vehicle weight of 129,000 lbs. across the region. The report estimated that total truck vehicle miles traveled (VMT) would decline by about 25 percent relative to the base case (no-action scenario), with the reduction concentrated in long-haul trips (-27.6 percent; against -5.5 percent for short-haul truck VMT).

In addition, the fleet of vehicles would change. Specifically, five- and six-axle semi-trailer and double-trailer units would be used less, as seven- or eight-axle double-trailer and triple-trailer units are used more (Table 26). As noted in the report, however, safety remains a major concern. And there is no consensus on the potential safety impacts of allowing heavier LCVs. Public opinion about larger trucks on highways has generally been negative. Therefore, strong support from state officials and a public awareness campaign would likely be integral to any harmonization effort.

[37] Harrison (1999), however, observes that the majority of trade from Canada or Mexico crosses the border on 5-axle semi-trailer trucks, loaded to U.S. limits (page 148).

[38] The thirteen states considered in the report are Montana, Washington, Oregon, Nevada, Idaho, Utah, Wyoming, Colorado, North Dakota, South Dakota, Nebraska, Kansas, and Oklahoma.

Table 26: Results of U.S. DOT Western Uniformity Scenario Analysis

Vehicle Configuration	Base Case		Uniformity Scenario		
	VMT (millions)	Percent Total	VMT (millions)	Percent Total	Percent Change
5-axle Tractor Semi-Trailer	14,476	77%	3,442	25%	-76%
6-axle Tractor Semi-Trailer	1,924	10%	938	7%	-51%
5- or 6-axle Double	1,351	7%	750	5%	-44%
6-axle Truck Trailer	626	3%	607	4%	-3%
7-axle Double	188	1%	2,190	16%	1,065%
8-or more axle Double	213	1%	5,626	40%	2,541%
Triples	45	0%	473	3%	951%
Total	**18,823**	**100%**	**14,026**	**100%**	**-25%**

Source: U.S. DOT (2004)

Stephens et al. (1996) evaluates the impacts of adopting Canadian interprovincial size and weight regulations at the regional or national level, on the Montana State Highway System, specifically. Two hybrid scenarios (with gross weight limits of 128,000 lbs. and 126,000 lbs.) where Montana axle weight limits are retained are also assessed. Under all scenarios, simulation results indicate that total truck traffic would fall, by up to three percent, as freight is shifted or added to higher-capacity vehicles. Nominal reductions in traffic would occur even in scenarios where freight is diverted from other modes (page 3-32). The composition of the fleet would change, with a reduction in the use of five-axle tractor semi-trailer units from 66 to 44 percent of the fleet, and increases in the relative share of heavier trucks. The absolute number of heavy trucks, however, would remain more or less constant. Changes in the composition of the fleet would have an impact on bridges and pavements along Montana's highway system; with potential bridge deficiencies, accelerated deterioration of concrete decks and beams, accelerated fatigue of steel structure, reductions in the life of existing pavements, and increases in the thickness of future overlays. Long-term pavement demands (as measured in Equivalent Single Axle Loads or ESALs) would increase by 3 to 4 percent, depending on the scenario (page 8-4).

The interviews with industry representatives conducted as part of this study provided limited information with respect to truck size and weight regulations. The following questions were asked: *"Would the harmonization of truck weight and size regulations (between the United States and Canada) affect the way you are conducting your business? Why or why not?"* For one carrier, harmonization would have no impact on their business because their current fleet does not include any oversized vehicles (*"they do not ship with extra axles"*). Similarly, another carrier indicated that harmonization would have no effect on their operations, as their shipments generally *"moves quickly over the border"* (with adequate paperwork); but mentioned that this was *"probably atypical for other companies"*. Finally, a representative of the Agriculture sector pointed out that allowing heavier loads from Canada would be advantageous, as heavier loads are often trans-loaded around the border into two trucks to meet U.S. weight restrictions.

6.3.2 Assumptions Used in Forecasting

Based on the research findings summarized in the previous section, harmonization of truck size and weight regulations between the United States and Canada (and within the United States, or at least within the states currently allowing LCVs) to Canadian standards, could have the following effects on Montana's ports of entry and highways:

- Reduction in overall truck traffic, in particular for long-haul trucks. Short-haul shipments with origin or destination in Montana can already cross the border on LCVs with specifications close – or similar – to Canadian limits (e.g., with gross weights of up to 131,060 lbs., or 137,800 lbs. on I-15 between the border and Shelby);

- Reduction in the relative share of five-axle semi-trailer units (now the preferred vehicle for incoming NAFTA trade by truck, according to Harrison 1999); and increase in the share of double- and possibly triple-trailer trucks; and

- Potential shifts in the distribution of truck flows across POEs, depending on the class and condition of connecting highways. Thus, other things being equal, the use of heavier trucks may further concentrate traffic along I-15, to Sweet Grass. Alternatively, generalization of the special provision at Shelby may help divert LCVs away from I-15 on to other routes, and ports.

Table 27 summarizes the assumptions used to generate the traffic forecasts presented in Chapter 7. The percentage changes are applied to all ports and connecting highways within the study area, with no further adjustments. Also shown in the table are assumed impacts in terms of number of trucks per day at Wild Horse (top estimate) and Morgan (bottom estimate)[39]. Due to potential network effects and complex payload and routing considerations, it was not possible to develop more detailed estimates of impacts.

Table 27: Impacts of Truck Size and Weight Harmonization

	Most Likely	Low	High
Truck Traffic at POEs	-10% (-2 trucks/day) (-2 trucks/day)	-20% (-4 trucks/day) (-3 trucks/day)	-3% (-1 truck/day) (-1 truck/day)
Truck Traffic along Connecting Highways	-10% (-3 trucks/day) (-3 trucks/day)	-20% (-5 trucks/day) (-5 trucks/day)	-3% (-1 truck/day) (-1 truck/day)

Notes: Changes in the daily number of trucks at Wild Horse (top) and Morgan (bottom) shown in parentheses; estimates are rounded to the nearest integer value
Source: HDR Assumptions, based on evidence presented in literature

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[39] Both estimates are based on truck traffic observed in 2012: 21 trucks at Wild Horse; 17 trucks at Morgan; and 27 trucks on average in the S-232 and N-99 corridors.

7 TRAFFIC PROJECTIONS

This chapter provides risk-adjusted projections of truck and commercial auto traffic, over a 20-year period, at all Phase 1 POEs combined (Section 7.1) and at the ports of Wild Horse and Morgan (Section 7.2 and Section 7.3). Traffic forecasts for US Highway 191 between US 2 and Morgan; and for Secondary Highway 232 between US 2 and Wild Horse are provided as well. All projections herein are preliminary and subject to revisions.

7.1 Forecast of Commercial Traffic at all Phase 1 Ports Combined

Twenty-year forecasts of commercial traffic at all ports considered in Phase 1 of the ICED Study are summarized below, for Trucks (Section 7.1.1) and Passenger Vehicles (Section 7.1.2). Each sub-section begins with an overview of recent growth in border crossings.

7.1.1 Trucks

Recent growth in southbound trucks passing through the ICED 1 Study Area ports is illustrated in Figure 63. Annual southbound crossings at all Montana ports and across the entire northern border are shown for comparison. The chart is based on data reported by CBP, and available through the U.S. Bureau of Transportation Statistics.

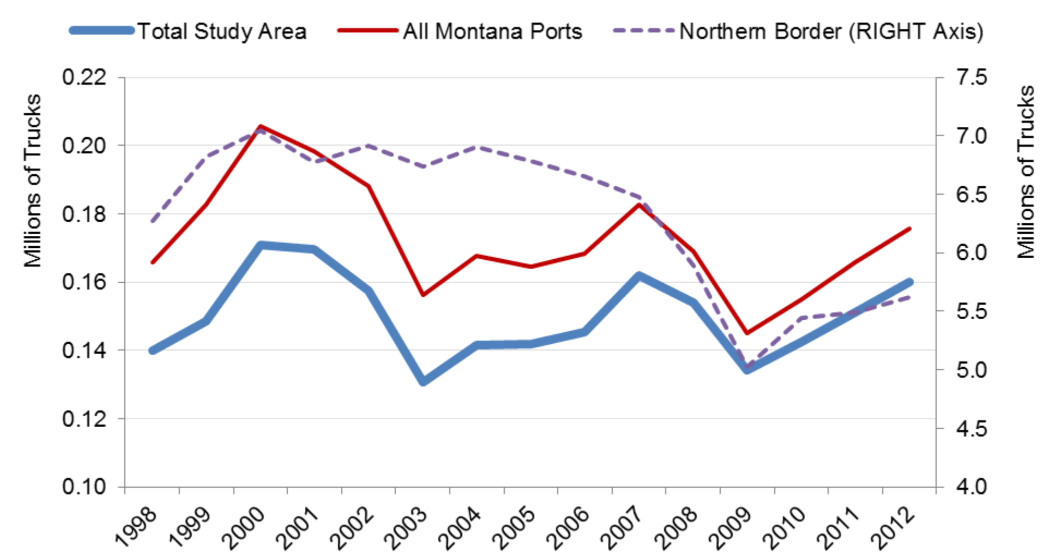

Figure 63: Number of Southbound Crossings by Trucks, 1998 – 2012

Source: BTS (2013)

Between 1998 and 2012, southbound truck traffic in the study area grew at an average annual rate of 1.0 percent, with – as can be seen in Figure 63 – periods of rapid growth alternating with periods of decline.

Thus, between the trough of 2009 and the end of 2012, traffic grew by 6.1 percent on average annually within the study area, and by 3.9 percent across the U.S. – Canada border. Estimates of southbound truck traffic at individual ports can be found in Table 28 below[40].

Table 28: Recent Growth in Incoming Trucks by Port, 1998 – 2012

	Annual Incoming Trucks			Average of Annual Growth Rates			Average Annual Growth Rate
	1998	2008	2012	1998–2007	2008–2012	Full Period	
Wild Horse	N/A	1,244	1,621	5.6%	-0.4%	1.8%	-4.3%
Morgan	1,735	464	1,887	-6.8%	38.7%	8.4%	0.6%
Sweet Grass	120,084	135,999	132,341	2.5%	-0.5%	1.5%	0.7%
Willow Creek*	N/A	32	0	-4.3%	-24.0%	-17.4%	n/a
Turner	410	302	1,682	1.4%	55.0%	19.3%	10.6%
Opheim	547	321	1,221	13.3%	40.3%	22.3%	5.9%
Scobey	149	89	1,750	15.9%	103.9%	45.2%	19.2%
Whitetail	78	31	158	10.1%	40.3%	20.2%	5.2%
Raymond	17,020	15,629	19,244	2.4%	2.0%	2.3%	0.9%
Total Study Area	**140,023**	**154,111**	**159,904**	**2.4%**	**0.1%**	**1.6%**	**1.0%**
Other Ports in MT	**25,741**	**14,824**	**15,866**	**-0.6%**	**-3.0%**	**-1.4%**	**-3.4%**
Total MT	**165,764**	**168,935**	**175,770**	**1.9%**	**-0.4%**	**1.2%**	**0.4%**
Northern Border	**6,270,934**	**5,894,551**	**5,623,507**	**1.2%**	**-2.4%**	**0.0%**	**-0.8%**

*Notes: In this table, N/A stands for Not Available; * BTS reports zero southbound truck at Willow Creek in 2012*
Source: BTS (2013)

Figure 64 illustrates the growth in northbound trucks passing through ports located in the ICED 1 Study Area, between 1990 and 2012. As in Figure 63, northbound crossings at all Montana ports (i.e., Canadian ports located along the Montana – Canada border) and across the entire northern border are shown for comparison. The chart is based on data from the Canada Border Services Agency (CBSA), available through Statistics Canada.

[40] Annual traffic data and annual growth rates can be found in Appendix B. In Table 28, the Averages of Annual Growth Rates were calculated as simple averages of annual growth rates over the specified periods. For example, over the period 1998 – 2012, the average of all 14 annual growth rates for the study area is 1.6 percent. The average annual (or compound) growth rate was estimated as (*End Year Traffic* / *First Year Traffic*) ^ (1 / *Number of Years*) – 1, where *First Year Traffic* is the number of trucks in 1998, *End Year Traffic* is the number of trucks in 2012, and *Number of Years* = 2012 – 1998 = 14. *First Year Traffic* and *Number of Years* are different for Wild Horse (2004 and 8, respectively) and Willow Creek (2005 and 7).

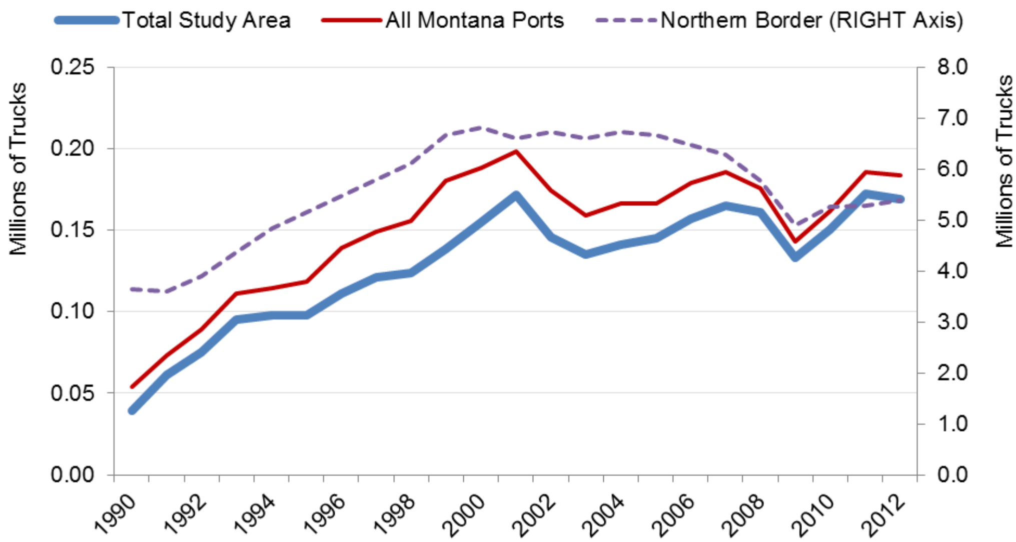

Figure 64: Number of Northbound Crossings by Trucks, 1990 – 2012

Source: Statistics Canada (Table 427-0002)

Figure 65 compares variations in southbound truck traffic (within the ICED 1 Study Area) reported by CBP with traffic count data obtained from MDT for all highway segments immediately adjacent to the study area POEs. These data, expressed as Annual Average Daily Traffic (AADT) for all trucks[41], are generally consistent with the statistics reported by CBP.

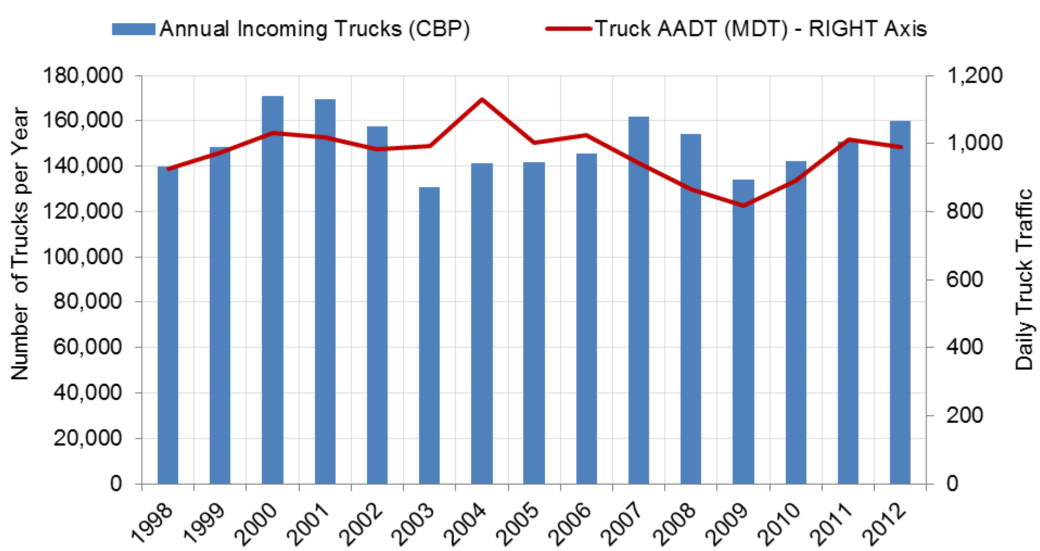

Figure 65: Incoming Trucks and Truck AADT at all Phase 1 Ports, 1998 – 2012

Sources: BTS (2013) and MDT (2013a)

[41] Including small trucks (identified as Types 5 to 7 in FHWA's vehicle classification system) and large trucks (Types 8 to 13)

The above data, along with the methods and assumptions described in Chapter 5, were used to develop risk-adjusted forecasts of daily truck traffic at all ports within the study area (that is, at all the ports highlighted in Figure 62, between and including Sweet Grass and Raymond).

These forecasts are shown in Figure 66 below. The figure includes historical data up to 2012, along with four different forecasts:

- Most Likely: the median or 50th percentile of the distribution of probable traffic outcomes developed with the economy-based forecasting model described in Chapter 5;
- Lower 10%: the 10th percentile of the distribution of probable traffic outcomes (there is a 90 percent probability that actual traffic will be higher than this value);
- Upper 10%: the 90th percentile of the distribution of probable traffic outcomes (there is only a 10 percent probability that actual traffic will be higher than this value); and
- Historical Trend: the 50th percentile of the distribution of probable traffic outcomes developed solely on the basis of historical growth.

The low and high forecast lines (Lower 10% and Upper 10%, respectively) shown in Figure 66 provide an 80 percent prediction interval, that is, a range of reasonably likely traffic growth outcomes.

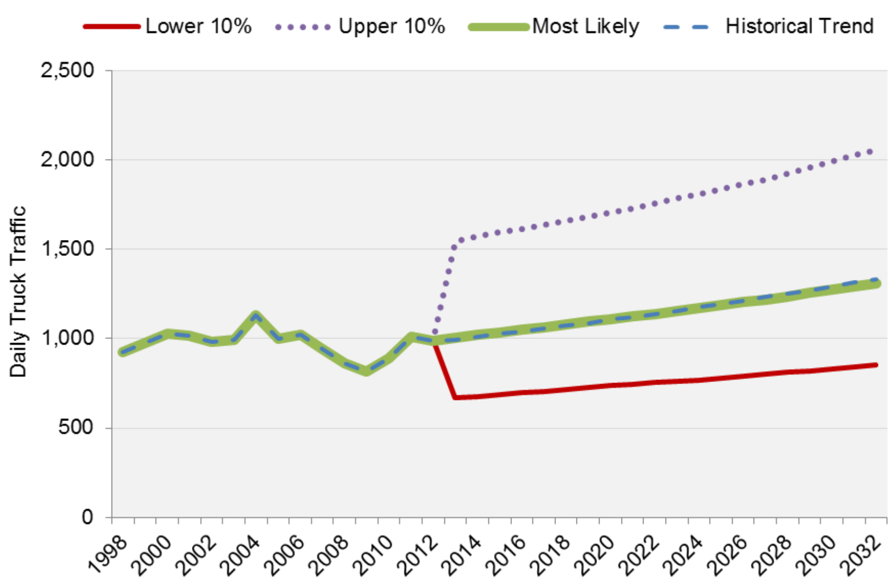

Figure 66: Risk-Adjusted Forecast of Daily Truck Traffic at all ICED 1 Ports Combined, 1998 – 2032

Source: HDR Analysis

Overall, daily truck traffic at all POEs within the study area is expected to grow at an average annual rate of 1.4 percent between 2012 and 2032, to reach 1,310 vehicles daily at the end of the period (most likely forecast). Results from statistical simulations also indicate that:

- Daily truck traffic could grow at a higher rate of 3.7 percent per year with a 10 percent probability, to reach 2,060 vehicles a day in 2032 (Upper 10%); and

- There is a 90 percent probability that truck AADT will grow by at least -0.7 percent a year, to reach 850 vehicles in 2032 (Lower 10%).

Traffic growth forecasts by port are summarized in Table 29. Note that the variability in projected growth rates (the spread between the low-end and the high-end of the prediction intervals) depends in part on historical variations, and may vary across ports. In general, wider intervals are expected at ports with smaller volumes.

Table 29: Average Annual Growth Rates for Trucks at all POEs, 2012 – 2032

	Low	Most Likely	High	High – Low Spread	Historical Trend
Wild Horse	-0.6%	1.7%	4.1%	4.7%	2.6%
Morgan	-1.1%	1.4%	3.9%	5.0%	2.8%
Sweet Grass	-0.5%	1.4%	3.6%	4.1%	1.5%
Willow Creek	-6.7%	-0.4%	3.4%	10.1%	2.8%
Turner	-5.6%	1.1%	4.7%	10.3%	-3.4%
Opheim	-8.6%	2.3%	6.6%	15.2%	-1.1%
Scobey	-9.8%	0.8%	4.6%	14.4%	-2.3%
Whitetail (CLOSED)	N/A	N/A	N/A	N/A	N/A
Raymond	-1.1%	1.2%	3.6%	4.7%	1.8%
All Ports Combined	**-0.7%**	**1.4%**	**3.7%**	**4.4%**	**1.5%**

Note: In this table, N/A stands for Not Applicable; the High-Low Spread in Column 5 is the difference, in percentage points, between the Low and High estimates.
Source: HDR Analysis

7.1.2 Passenger Vehicles

Growth in southbound passenger vehicle crossings at all POEs within the ICED 1 Study Area is illustrated in Figure 67. As in Figure 63, annual crossings at all Montana ports and at all ports along the northern border are included for comparison.

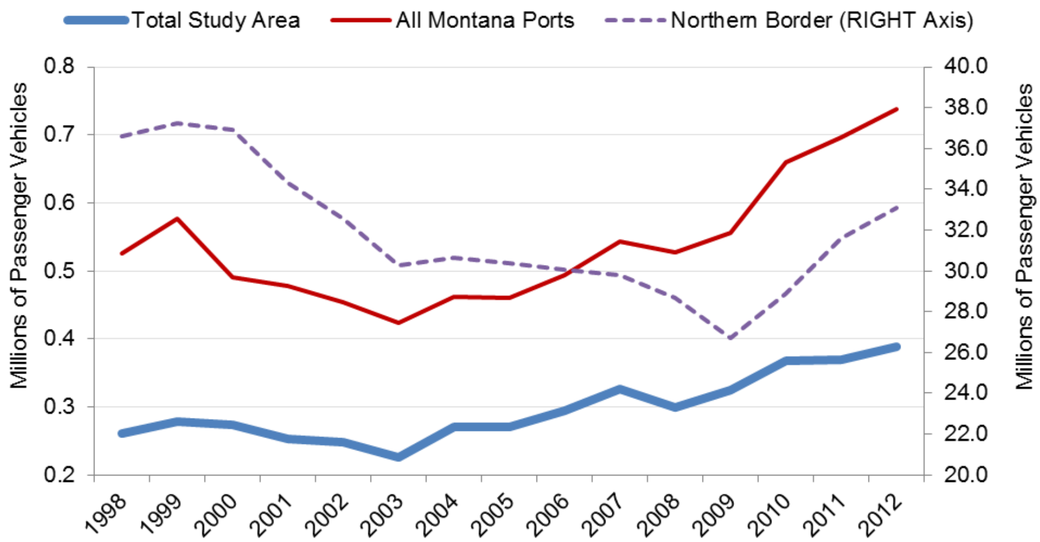

Figure 67: Number of Southbound Crossings by Passenger Vehicles, 1998 – 2012

Source: BTS (2013)

Between 1998 and 2012, incoming passenger vehicles in the study area grew at an average annual rate of 2.4 percent (simple average of annual growth rates). As can be seen in Figure 67, growth was particularly strong between 2004 and 2012 (+6.5 percent on average). Growth was also generally stronger in the study area than it was for the entire border. A breakdown of traffic growth estimates by port is provided in Table 30 below[42].

Table 30: Recent Growth in Incoming Passenger Vehicles by Port, 1998 – 2012

	Annual Incoming Passenger Vehicles			Average of Annual Growth Rates			Average Annual Growth Rate
	1998	2008	2012	1998–2007	2008–2012	Full Period	
Wild Horse	N/A	8,398	18,567	16.1%	10.3%	12.5%	6.2%
Morgan	5,187	6,327	6,820	-0.5%	4.2%	1.0%	2.0%
Sweet Grass	198,866	241,991	307,398	2.0%	3.8%	2.6%	3.2%
Willow Creek	N/A	2,179	4,535	10.1%	18.2%	15.9%	11.8%
Turner	6,692	6,656	10,492	-2.8%	12.8%	2.4%	3.3%
Opheim	5,004	3,933	5,966	-1.1%	10.4%	2.7%	1.3%
Scobey	4,053	5,034	6,685	0.4%	6.3%	2.3%	3.6%
Whitetail	5,501	642	1,036	-13.2%	7.1%	-6.4%	-11.2%
Raymond	35,491	24,389	26,740	-2.9%	1.1%	-1.5%	-2.0%
Total Study Area	**260,794**	**299,549**	**388,239**	**1.7%**	**3.8%**	**2.4%**	**2.9%**
Other Ports in MT	**264,965**	**227,109**	**349,485**	**-0.8%**	**10.3%**	**2.9%**	**2.0%**
Total MT	**525,759**	**526,658**	**737,724**	**0.4%**	**6.5%**	**2.4%**	**2.4%**
Northern Border	**36,596,806**	**28,686,786**	**33,083,636**	**-2.6%**	**2.3%**	**-1.0%**	**-0.7%**

Notes: In this table, N/A stands for Not Available
Source: BTS (2013)

[42] Annual traffic data and traffic growth estimates can be found in Appendix B.

Annual northbound crossings by passenger vehicles are illustrated in Figure 68. Traffic through ports along the Montana – Canada border declined steadily between 1991 and 2004. They rebounded after 2005 to reach, in 2012, a level close to that of the early nineties. A similar pattern can be observed for ports within the ICED 1 Study Area.

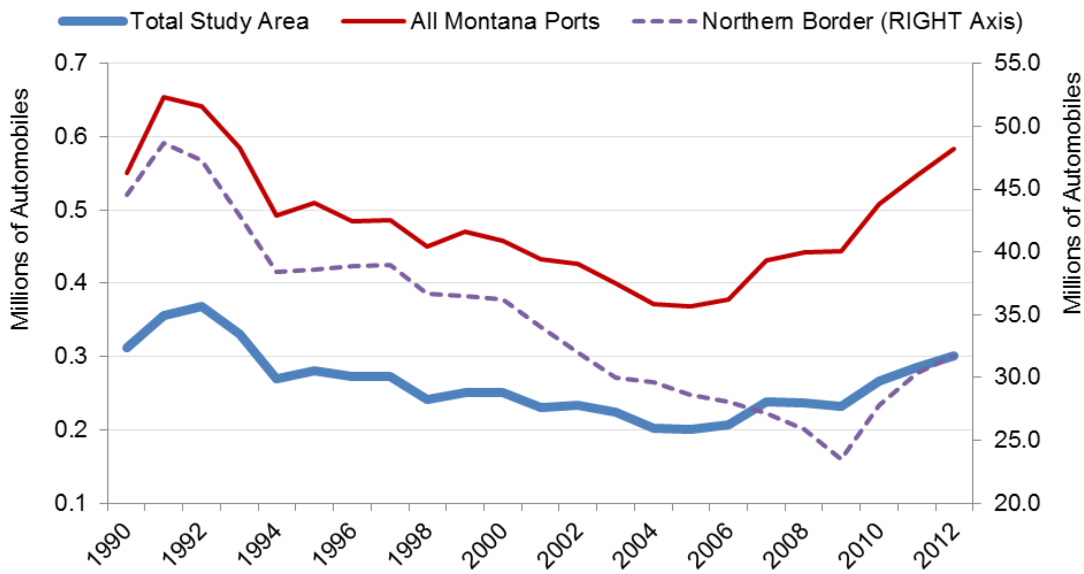

Figure 68: Number of Northbound Crossings by Passenger Vehicles (Automobiles), 1990 – 2012

Source: Statistics Canada (Table 427-0002)

Additional data reported by CBSA suggest that most of the recent growth in automobile crossings within the ICED 1 Study Area is attributable to Canadian vehicles (Figure E-2). Thus, according to CBSA, the number of U.S. vehicles entering Canada through ports located within the study area fell between 2005 and 2012 (from 69,913 in 2005 to 57,081 in 2012); while the number of Canadian vehicles returning to Canada increased sharply (from 130,492 in 2005 to 243,909 in 2012)[43].

Traffic count data obtained from MDT for all highway segments immediately adjacent to the POEs considered in the ICED 1 Study Area are shown, along with CBP data, in Figure 69. The MDT data are expressed as AADT for all vehicles other than trucks[44]. They are generally consistent with the statistics reported by CBP. The differences apparent in Figure 69 may be due

[43] Similarly, across the entire northern border, the number of U.S. automobiles entering Canada fell between 2005 and 2012 (from 14.4 to 9.7 million crossings), while the number of Canadian automobiles returning to Canada increased (from 21.0 to 27.6 million crossings), resulting in a net increase in the number of crossings of about 2 millions.

[44] Excluding trucks of all sizes, small and large (Types 5 to 13 in FHWA's vehicle classification system).

to variations in northbound traffic (AADT is bi-directional), to seasonal or daily variations not adequately represented in MDT's traffic counts, or to other measurement issues.

Nonetheless, based on these data, passenger vehicle traffic at the ports increased at an average annual rate of 0.9 percent between 1998 and 2011 (ignoring the decline reported for 2012); and at a simple average rate of 3.9 percent (average of annual growth rates between 1998 and 2011).

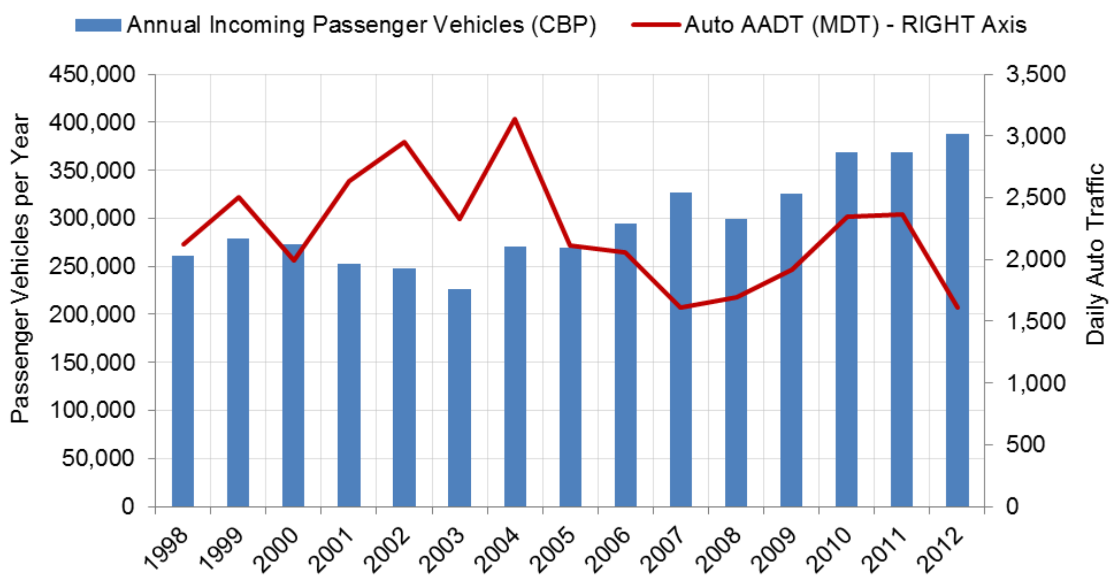

Figure 69: Incoming Passenger Vehicles and Auto AADT at all Phase 1 Ports, 1998 – 2012

Sources: BTS (2013), MDT (2013a), MDT (2013b)

The above data were used in the development of risk-adjusted forecasts of commercial auto traffic[45], at all ports within the study area. These forecasts are summarized in Figure 70 and Table 31.

[45] As defined earlier in this report.

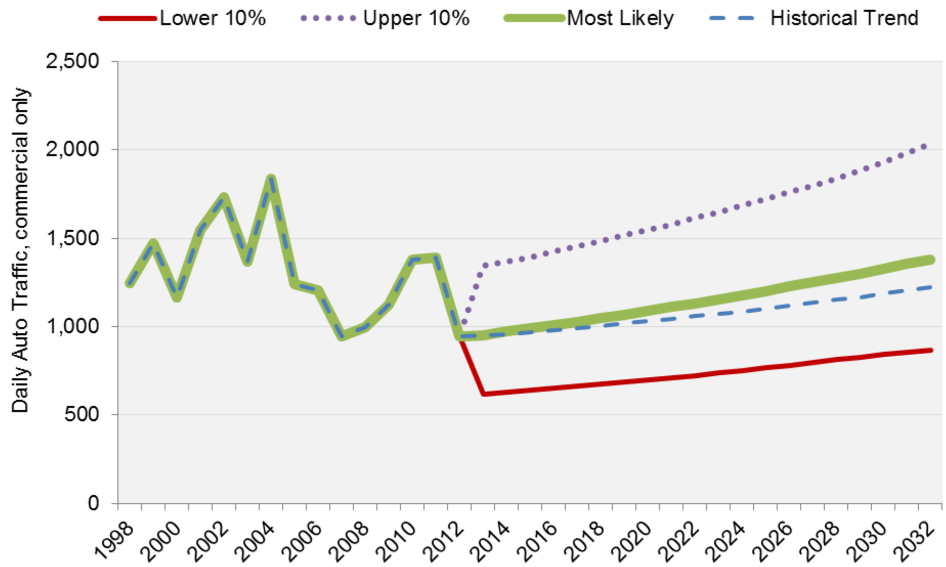

Figure 70: Risk-Adjusted Forecast of Daily Commercial Auto Traffic at all ICED 1 Ports Combined, 1998 - 2032

Source: HDR Analysis

Table 31: Average Annual Growth Rates for Commercial Autos at all POEs, 2012 – 2032

	Low	Most Likely	High	High – Low Spread	Historical Trend
Wild Horse	0.0%	2.3%	4.4%	4.4%	2.6%
Morgan	-0.3%	2.1%	4.1%	4.4%	2.8%
Sweet Grass	-0.1%	1.9%	3.6%	3.7%	1.5%
Willow Creek	-1.7%	1.2%	3.7%	5.4%	2.5%
Turner	-1.4%	2.9%	6.0%	7.4%	-3.4%
Opheim	-1.3%	1.8%	4.3%	5.6%	-0.7%
Scobey	-0.6%	1.8%	3.9%	4.5%	-1.9%
Whitetail (CLOSED)	N/A	N/A	N/A	N/A	N/A
Raymond	-1.1%	1.4%	3.5%	4.6%	1.7%
All Ports Combined	**-0.4%**	**1.9%**	**3.9%**	4.3%	**1.3%**

Note: In this table, N/A stands for Not Applicable; the High-Low Spread in Column 5 is the difference, in percentage points, between the Low and High estimates.
Source: HDR Analysis

7.2 Forecast of Commercial Traffic in the S-232 Corridor

This section provides twenty-year forecasts of commercial (and total) traffic at the Port of Wild Horse (Section 7.2.1), and for Secondary Highway 232 between the port and US 2 (Section 7.2.2). Supporting data can be found in appendices D and E.

7.2.1 Forecast of Commercial Traffic at Wild Horse

7.2.1.1 Truck Traffic

Truck traffic at the Port of Wild Horse remained relatively constant between 2004 and 2012, at about 20 to 30 trucks daily, in both directions (Table G-4, Count Site 2-14). In 2012, truck AADT at the port actually fell, from 25 to 21 vehicles. Data from CBP also indicate a decline in the number of incoming trucks at Wild Horse last year (from 2,242 in 2011 to 1,621 in 2012). Longer time series available through Statistics Canada further suggest that the Wild Horse corridor lost large volumes of northbound commercial traffic between the second half of the 1990s and the mid-2000s (Figure E-3). As can be seen in Figure 71, truck traffic at the port – in the absence of operational and policy changes[46] – is expected to grow at a modest rate throughout the forecasting horizon. By 2032, truck AADT (in both directions, on the highway segment just south of the port) would range between 19 vehicles (Lower 10%) and 47 vehicles (Upper 10%), with a most likely forecast of 30 trucks per day.

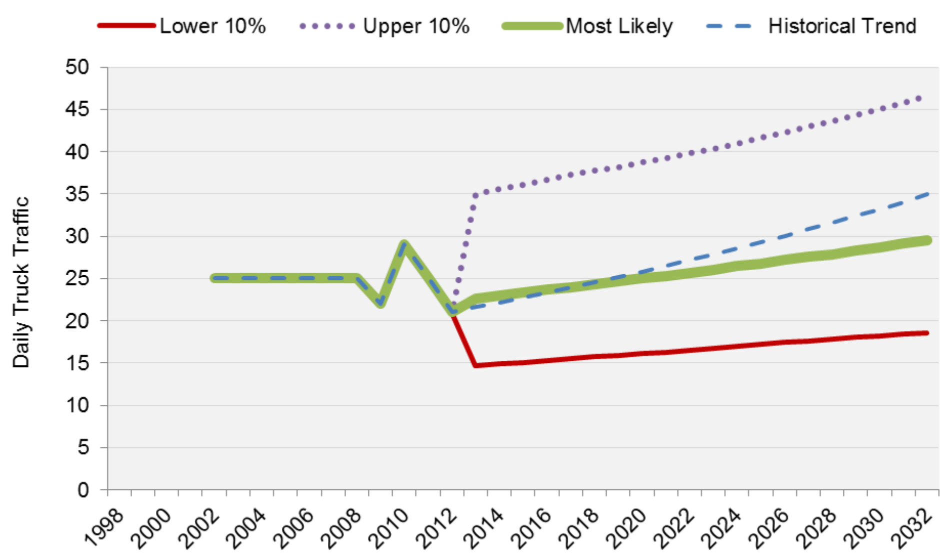

Figure 71: Forecast of Daily Truck Traffic at the Wild Horse POE, without Operational and Policy Changes, 2012 – 2032

Source: HDR Analysis

[46] The impacts of CWB reforms are accounted for in the simulation results; not those of a possible extension of port service hours, or the potential harmonization of truck size & weight regulations.

The combined impacts of extended port service hours (to 16 hours a day, 7 days a week, all year long) and Truck Size & Weight harmonization are illustrated in Figure 72. For simplification, it was assumed that both changes would take effect in the first forecast year (2013). Under this scenario, truck AADT at the port would grow at an annualized rate of 2.7 percent between 2012 and 2032, to reach 36 trucks a day at the end of the period (most likely forecast). Future daily truck traffic could be as low as 21 trucks (Lower 10%), and as high as 61 trucks (Upper 10%).

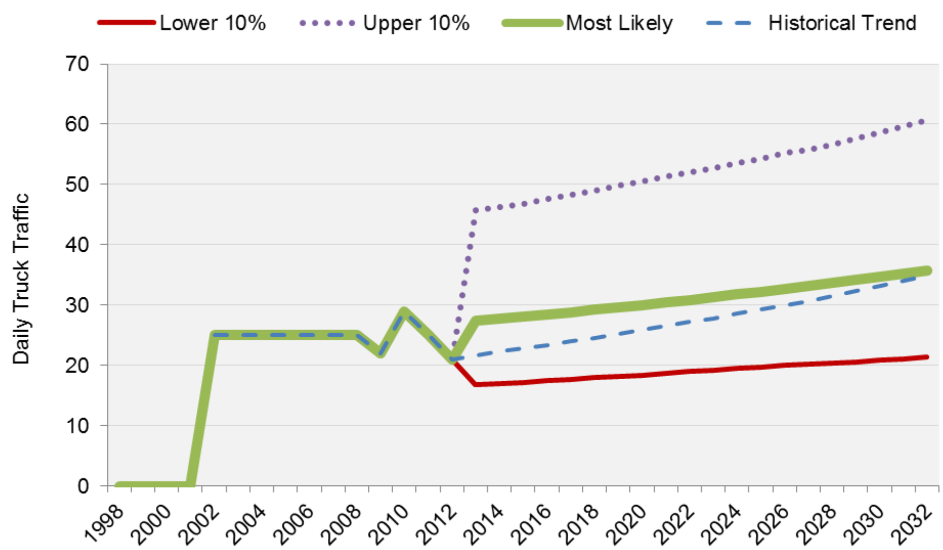

Figure 72: Forecast of Daily Truck Traffic at the Wild Horse POE, with Operational and Policy Changes, 2012 – 2032

Source: HDR Analysis

7.2.1.2 Commercial Auto Traffic

Auto traffic (for all purposes, including commercial and personal trips) at the Port of Wild Horse increased rapidly between 2009 and 2012 (to about 140 vehicles a day), but remained below the peak levels of 2003 – 2004 (Figure D-10). Data from CBP also indicate a relatively strong growth in southbound auto traffic in recent years, from about 8,400 vehicles in 2008 to nearly 18,600 in 2012 (Table 30). Time series from Statistics Canada suggest that most of this growth is attributable to Canadian passenger vehicles entering the U.S. (possibly to take advantage of shopping opportunities brought about by a stronger Canadian dollar), as opposed to U.S. vehicles returning from Canada.

Projections of commercial auto traffic at the port (without operational and policy changes) are shown in Figure 73. Traffic is expected to grow at an average annual rate of 2.3 percent between 2012 and 2032, to reach 129 vehicles daily in 2032 (most likely forecast).

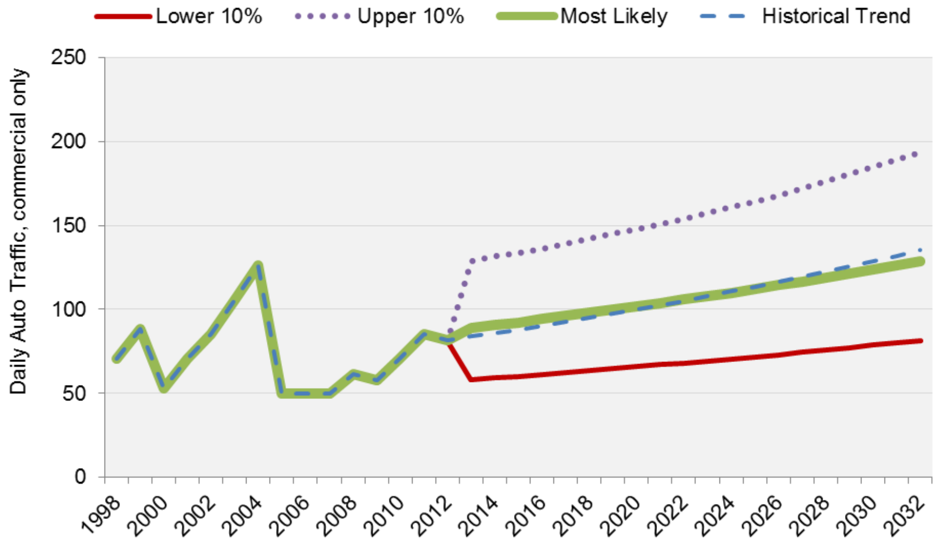

Figure 73: Forecast of Daily Commercial Auto Traffic at the Wild Horse POE, without Operational and Policy Changes, 2012 – 2032

Source: HDR Analysis

The effects of extended port service hours and Truck Size & Weight harmonization are illustrated in Figure 74 below. Under this scenario, commercial auto traffic at the port is likely to reach 149 vehicles a day in 2032 (an average annual growth of 3.1 percent).

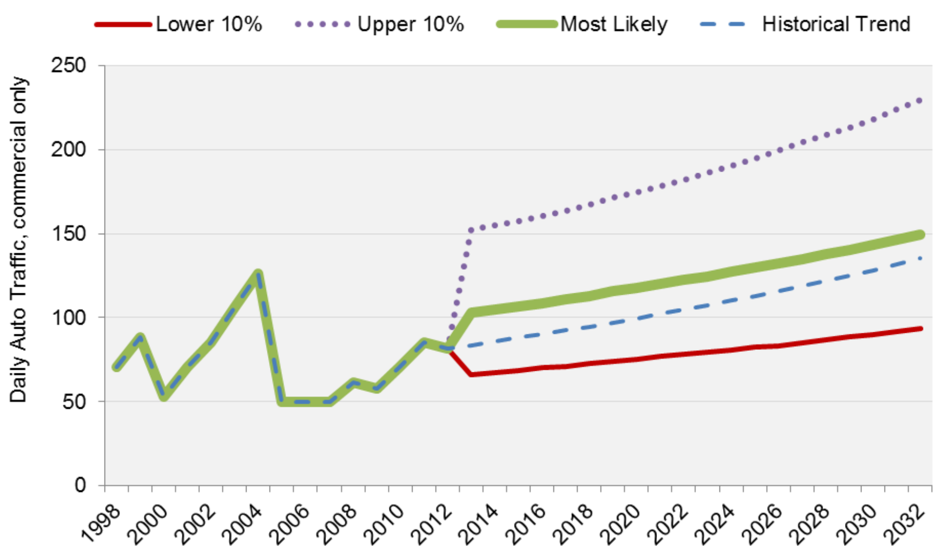

Figure 74: Forecast of Daily Commercial Auto Traffic at the Wild Horse POE, with Operational and Policy Changes, 2012 – 2032

Source: HDR Analysis

7.2.1.3 Total Traffic

Projections of total traffic at the port (AADT, including all vehicle types), assuming extended port service hours and Truck Size & Weight harmonization are shown in Figure 75.

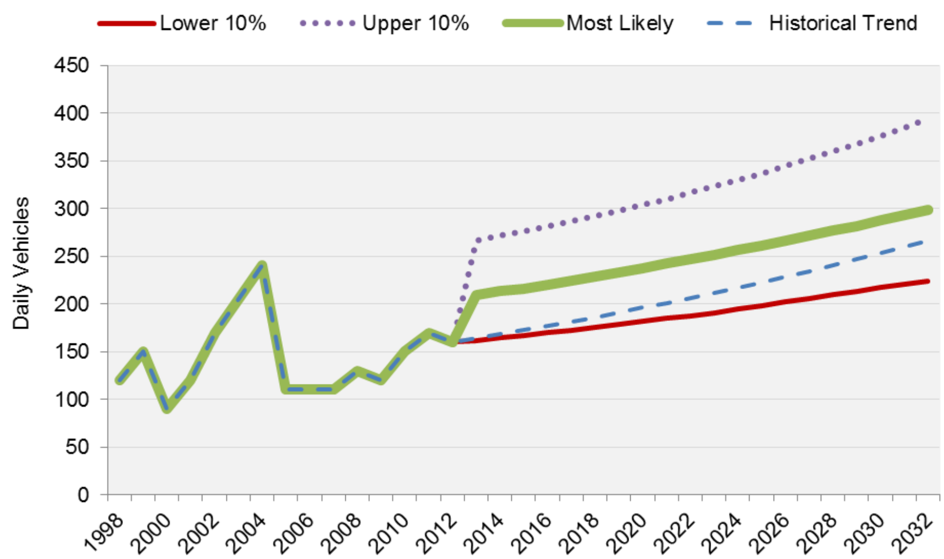

Figure 75: Forecast of Total Daily Traffic at the Wild Horse POE, with Operational and Policy Changes, 2012 – 2032

Source: HDR Analysis

AADT is expected to grow at an average annual rate of 3.2 percent over the forecast period, to reach just about 300 vehicles daily in 2032 (most likely forecast). There is a 90 percent probability that daily traffic will exceed 224 vehicles in 2032 (Lower 10% value), and a 10 percent probability that it will reach 394 vehicles a day (Upper 10%). Note that the rise shown in the chart for 2013 is due to the simplifying assumption that all operational and policy changes would occur in the first forecast year.

7.2.2 Forecast of Commercial Traffic along S-232

Traffic data in the S-232 corridor between Wild Horse and US 2 are available at ten count sites (Appendix G, Table G-1). The data and projections presented in the sections below are weighted average traffic volumes, where the lengths of the sections between count sites are used as weights.

7.2.2.1 Truck Traffic

Twenty-year forecasts of average truck traffic in the corridor are illustrated in Figure 76, with the effects of operational and policy changes (as specified in Chapter 6). In 2032, truck traffic is expected to range between 30 and 68 vehicles (80 percent prediction interval), with a most likely forecast of 44 trucks per day.

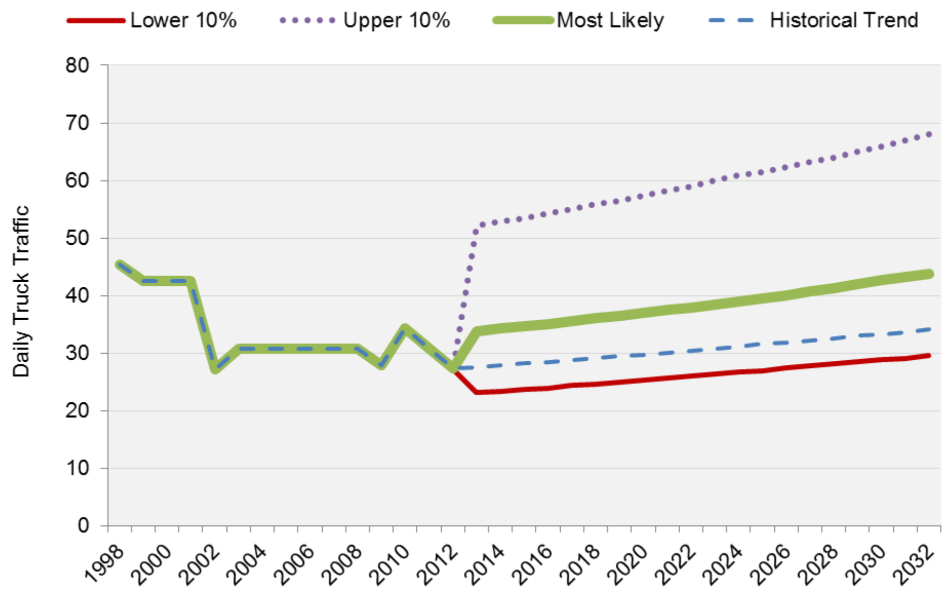

Figure 76: Forecast of Daily Truck Traffic in the S-232 Corridor, with Operational and Policy Changes, 2012 – 2032

Source: HDR Analysis

7.2.2.2 Commercial Auto Traffic

Risk-adjusted forecasts of average commercial auto traffic along S-232 are illustrated in Figure 77. By the end of the forecast period, traffic is expected to range between 180 and 402 vehicles, with a most likely forecast of 275 commercial autos per day.

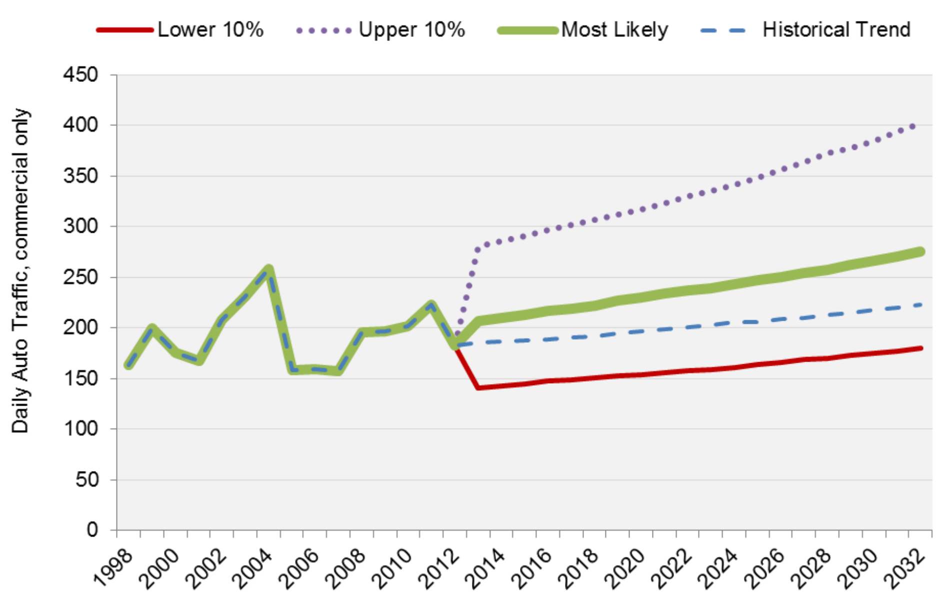

Figure 77: Forecast of Daily Commercial Auto Traffic in the S-232 Corridor, with Operational and Policy Changes, 2012 – 2032

Source: HDR Analysis

7.2.2.3 Total Traffic

As can be seen in Figure 78, total daily traffic in the S-232 corridor (including all vehicle types and trip purposes) is expected to reach 519 vehicles per day in 2032. This represents an average annual growth of about 2.2 percent. There is a 10 percent probability that AADT would reach 655 vehicles a day; and a 90 percent probability that it would exceed 413 vehicles.

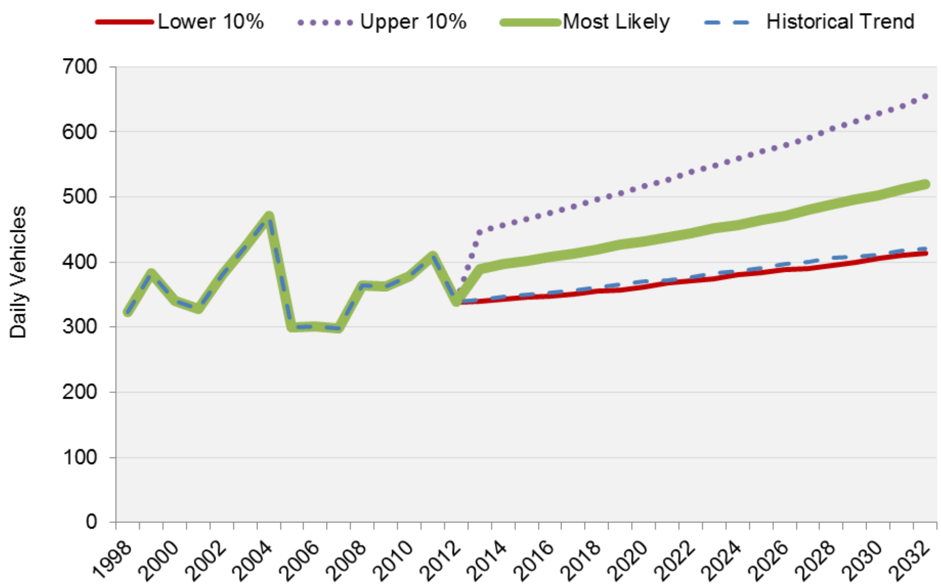

Figure 78: Forecast of Total Daily Traffic in the S-232 Corridor, with Operational and Policy Changes, 2012 – 2032

Source: HDR Analysis

7.3 Forecast of Commercial Traffic in the US 191 Corridor

This section provides risk-adjusted forecasts of commercial traffic at the Port of Morgan (Section 7.3.1), and for US Highway 191 between the port and US 2 (Section 7.3.2). Some supporting data are provided in appendices D and E.

7.3.1 Forecast of Commercial Traffic at Morgan

7.3.1.1 Truck Traffic

After a relatively steep decline from the late 1990s to 2008, truck traffic at the Port of Morgan increased by 70 percent between 2009 and 2012, from 10 to 16 trucks daily (Table G-6, Count Site 1-4). Growth was particularly strong in 2012: data from CBP suggest an increase of nearly 150 percent (from 758 to 1,887 trucks, southbound, annually). In the early months of 2013, southbound traffic levels were about three times higher than during the same period one year earlier (BTS 2013).

In the absence of operational and policy changes, truck traffic at Morgan is expected to grow at about 1.4 percent a year, between 2012 and 2032. By the end of the forecast horizon, truck AADT (in both directions, on the highway segment just south of the port) would range between 14 and 37 vehicles, with a most likely forecast of 23 trucks per day (Figure 79).

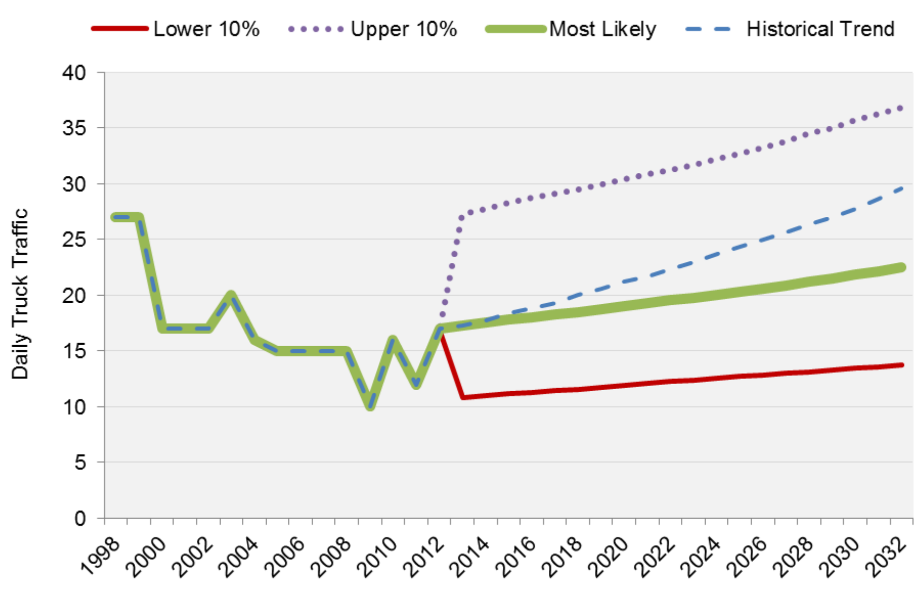

Figure 79: Forecast of Daily Truck Traffic at the Morgan POE, without Operational and Policy Changes, 2012 – 2032

Source: HDR Analysis

With extended port service hours and Truck Size & Weight harmonization, truck AADT at Morgan would grow at an annualized rate of 2.4 percent, to reach 28 trucks a day in 2032. This most likely forecast, along with an 80 percent prediction interval, is illustrated in Figure 80.

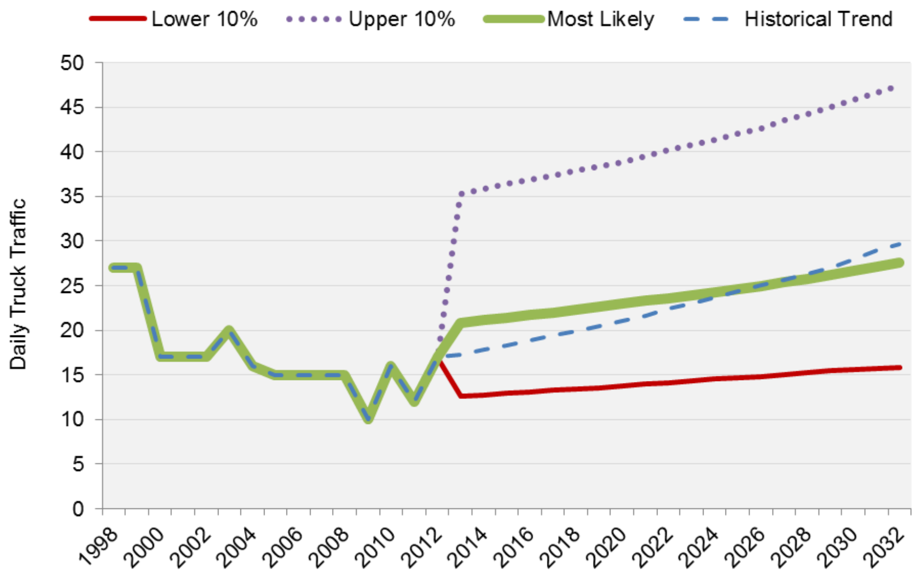

Figure 80: Forecast of Daily Truck Traffic at the Morgan POE, with Operational and Policy Changes, 2012 – 2032

Source: HDR Analysis

7.3.1.2 Commercial Auto Traffic

Auto traffic (for all purposes) at the Port of Morgan was relatively constant in the first half of the 2000s (at about 65 – 70 vehicles a day), fell sharply in 2007 and 2008, and rebounded in subsequent years to stabilize at about 60 vehicles a day (Figure D-12). Data from CBP and CBSA confirm the relative stability of passenger vehicle traffic in recent years.

Forecasts of commercial auto traffic at Morgan (without operational and policy changes) are summarized in Figure 81. Traffic is expected to grow at an average annual rate of 2.1 percent during the forecast period, up to 47 vehicles a day in 2032 (most likely forecast).

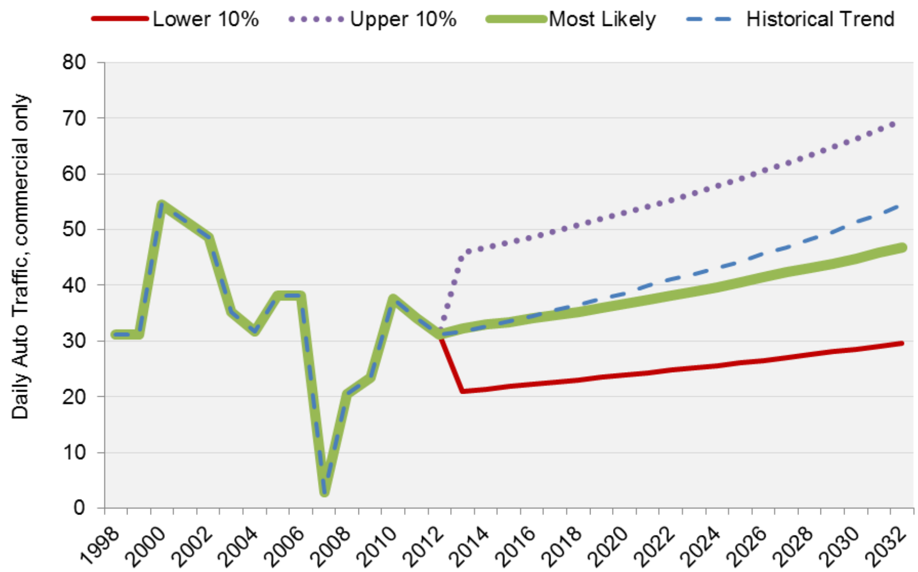

Figure 81: Forecast of Daily Commercial Auto Traffic at the Morgan POE, without Operational and Policy Changes, 2012 – 2032

Source: HDR Analysis

Traffic forecasts with extended port service hours and Truck Size & Weight harmonization are illustrated in Figure 82. Commercial auto traffic is expected to reach 54 vehicles a day in 2032 (most likely forecast), with an 80 percent predication interval ranging from 34 to 83 vehicles a day.

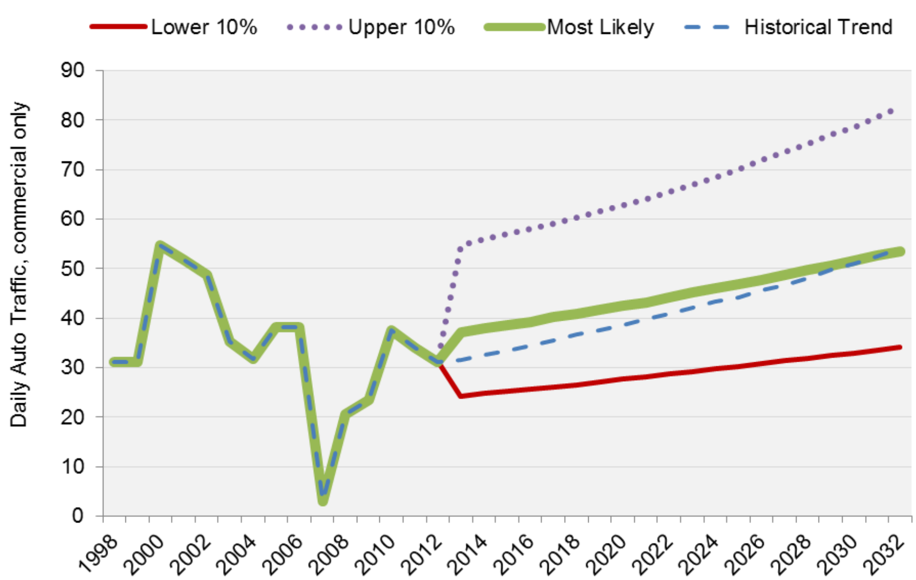

Figure 82: Forecast of Daily Commercial Auto Traffic at the Morgan POE, with Operational and Policy Changes, 2012 – 2032

Source: HDR Analysis

7.3.1.3 Total Traffic

Projections of total traffic at Morgan (including all vehicle types), assuming extended port service hours and Truck Size & Weight harmonization are shown in Figure 83.

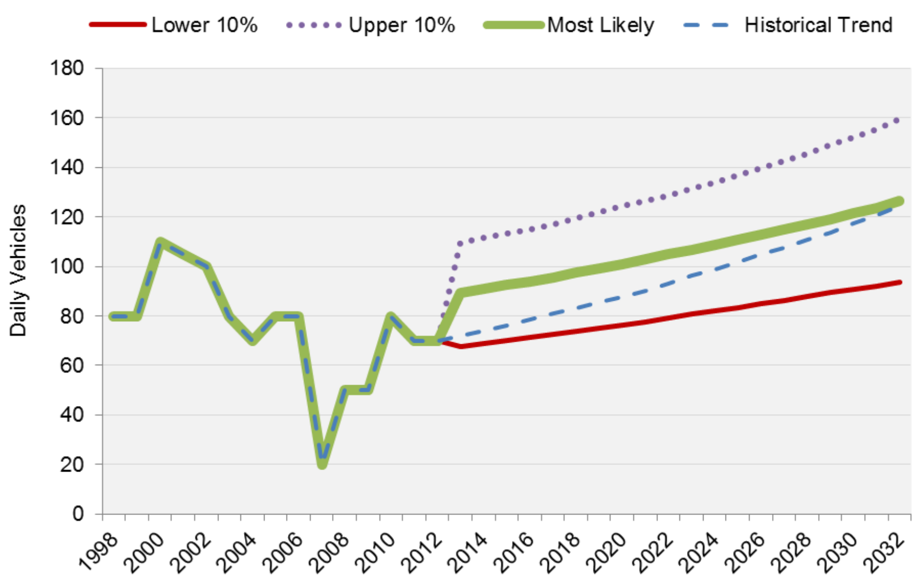

Figure 83: Forecast of Total Daily Traffic at the Morgan POE, with Operational and Policy Changes, 2012 – 2032

Source: HDR Analysis

AADT is expected to reach 126 vehicles a day in 2032 (most likely forecast) from 70 in 2012, an average annual growth of 3.0 percent over the forecast period.

7.3.2 Forecast of Commercial Traffic along US 191

Traffic data in the US 191 corridor between the POE at Morgan and US 2 are available at six count sites (Table G-2). As in Section 7.2.2, the data and projections presented below are weighted average traffic volumes, where the lengths of the sections between count sites are used as weights.

7.3.2.1 Truck Traffic

Forecasts of average truck traffic along US 191 are summarized in Figure 84 (with the effects of operational and policy changes). By 2032, daily truck traffic is expected to range between 28 and 59 vehicles, with a most likely forecast of 40 trucks per day.

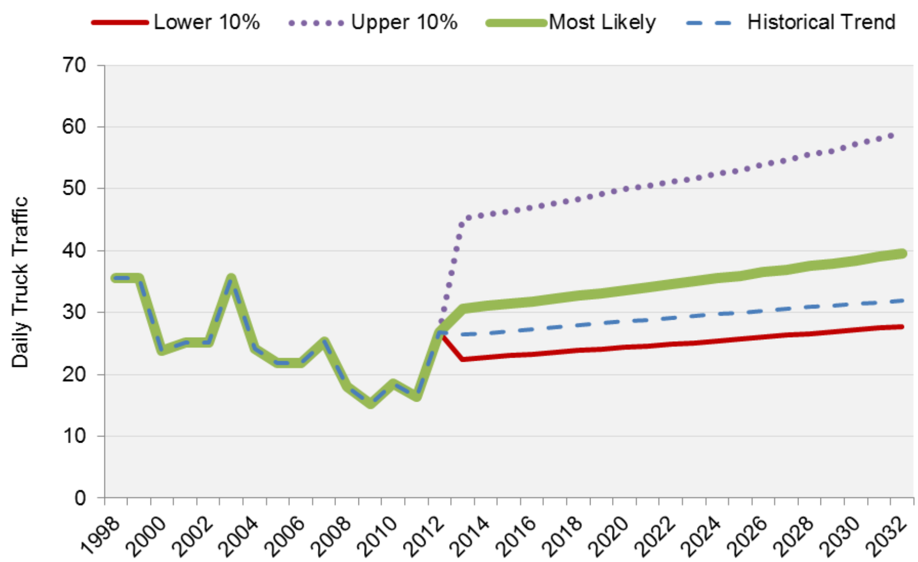

Figure 84: Forecast of Daily Truck Traffic in the US 191 Corridor, with Operational and Policy Changes, 2012 – 2032

Source: HDR Analysis

7.3.2.2 Commercial Auto Traffic

By the end of the forecast period, commercial auto traffic would range between 85 and 181 vehicles a day (Figure 85). The most likely forecast (128 autos daily) is about mid-way between the 10th and 90th percentiles; and corresponds to an average annual growth of 1.7 percent.

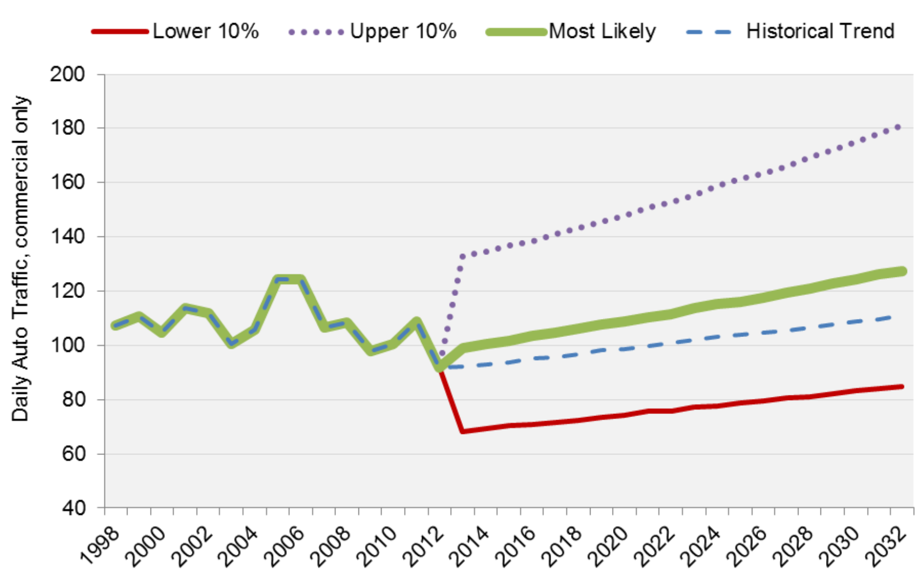

Figure 85: Forecast of Daily Commercial Auto Traffic in the US 191 Corridor, with Operational and Policy Changes, 2012 – 2032

Source: HDR Analysis

7.3.2.3 Total Traffic

Total traffic in the US 191 corridor is expected to reach 260 vehicles per day in 2032 (Figure 86). This represents an average annual growth of about 1.8 percent. There is a 10 percent probability that AADT would reach 315 vehicles a day, and a 90 percent probability that it would exceed 215 vehicles.

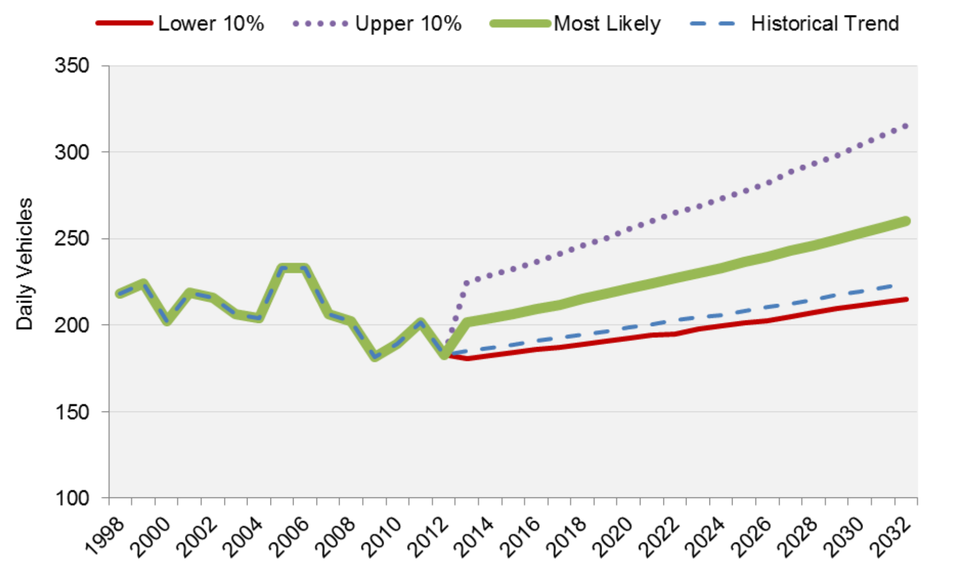

Figure 86: Forecast of Total Daily Traffic in the US 191 Corridor, with Operational and Policy Changes, 2012 – 2032

Source: HDR Analysis

7.4 Summary of Chapter 7

Tables 32 and 33 provide a high-level summary of the traffic projections presented in this chapter. As noted in the introduction, all projections are preliminary and subject to revisions.

Table 32: Summary of Traffic Projections for the S-232 Corridor

	Daily Traffic in 2012	Average Annual Growth Rate			Average Annual Growth Rate with Extended Port Service Hours & TS&W Harmonization		
		Low	Most Likely	High	Low	Most Likely	High
At Wild Horse POE							
Trucks	**21**	-0.6%	1.7%	4.1%	0.1%	2.7%	5.5%
Commercial Autos	**82**	0.0%	2.3%	4.4%	0.6%	3.1%	5.3%
Total Traffic	**160**	1.0%	2.4%	3.7%	1.7%	3.2%	4.6%
Along S-232							
Trucks	**27**	-0.2%	1.6%	3.5%	0.4%	2.4%	4.7%
Commercial Autos	**183**	-0.5%	1.7%	3.6%	-0.1%	2.0%	4.0%
Total Traffic	**338**	0.6%	1.8%	2.9%	1.0%	2.2%	3.4%

Source: HDR Analysis

Table 33: Summary of Traffic Projections for the US 191 Corridor

	Daily Traffic in 2012	Average Annual Growth Rate			Average Annual Growth Rate with Extended Port Service Hours & TS&W Harmonization		
		Low	Most Likely	High	Low	Most Likely	High
At Morgan POE							
Trucks	**17**	-1.1%	1.4%	3.9%	-0.3%	2.4%	5.3%
Commercial Autos	**31**	-0.3%	2.1%	4.1%	0.5%	2.8%	4.9%
Total Traffic	**70**	0.7%	2.1%	3.3%	1.5%	3.0%	4.2%
Along US 191							
Trucks	**27**	-0.2%	1.3%	3.0%	0.2%	2.0%	4.0%
Commercial Autos	**92**	-0.6%	1.4%	3.1%	-0.3%	1.7%	3.4%
Total Traffic	**183**	0.5%	1.4%	2.4%	0.8%	1.8%	2.8%

Source: HDR Analysis

The growth rates shown in Tables 32 and 33 are average annual growth rates in traffic at the selected ports (Morgan and Wild Horse) and along the corresponding highway segments (i.e., from the port to US 2). They are expressed as ranges, with a low, most likely and high values. The ranges were derived in such a way that – given the assumptions presented in this report – there is a high probability (80 percent) that they include the true – but unknown – future growth rates in traffic.

The use of risk analysis techniques, however, does not eliminate the risk of errors; and the ranges shown above are only as good as the individual probability distributions developed by the Project Team to populate the traffic growth model used in this study.

Consequently, the above results – along with other results presented in this report – should be interpreted with caution.

8 EXISTING CONDITIONS OF SELECTED HIGHWAYS AND PORTS OF ENTRY

This chapter provides a detailed assessment of existing conditions for the Montana Secondary Highway 232 (S-232) corridor (Section 8.1) and the US Highway 191 (US 191) corridor (Section 8.2), between US Highway 2 (US 2) and the Canadian border. It includes updated data on:

- Border crossing capacity and service hours;
- Traffic volumes and distribution by vehicle type;
- Seasonal and hourly distribution of traffic;
- Pavement width and pavement conditions;
- Level of service and congestion index; and
- Safety (number and severity of crashes).

8.1 Secondary Highway 232 between US 2 and Wild Horse

Existing conditions in the S-232 highway corridor are presented in this section. An overview of the corridor is provided first (Section 8.1.1), followed by a description of the port (Section 8.1.2) and recent data on traffic and highway infrastructure conditions (Section 8.1.3).

8.1.1 Corridor Overview

The S-232 corridor is located within Hill County, in Northern Montana. It connects US 2 in Havre, MT to the Port of Wild Horse (Figure 87). It is about 44 miles long.

S-232 is a Rural Major Collector with two lanes (one lane in each direction), an average pavement width of 25.4 feet, and limited or no shoulders. Pavement conditions are generally good, and the facility currently operates at LOS A (with average vehicle speeds at – or close to – posted speed limits)[47].

On the Canadian side, S-232 continues as Alberta Provincial Highway 41, with a connection to Highway 1 (i.e., Trans-Canada Highway) near Medicine Hat, about 90 miles to the north. Highway 41 is an Arterial (Service Level 2[48]), with two lanes (one lane in each direction) and limited or no shoulders.

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[47] As defined in Appendix A.

[48] Alberta's highway service classification system includes four levels: National Highway System (Level 1), Arterials (Level 2), Collectors (Level 3), and Locals (Level 4).

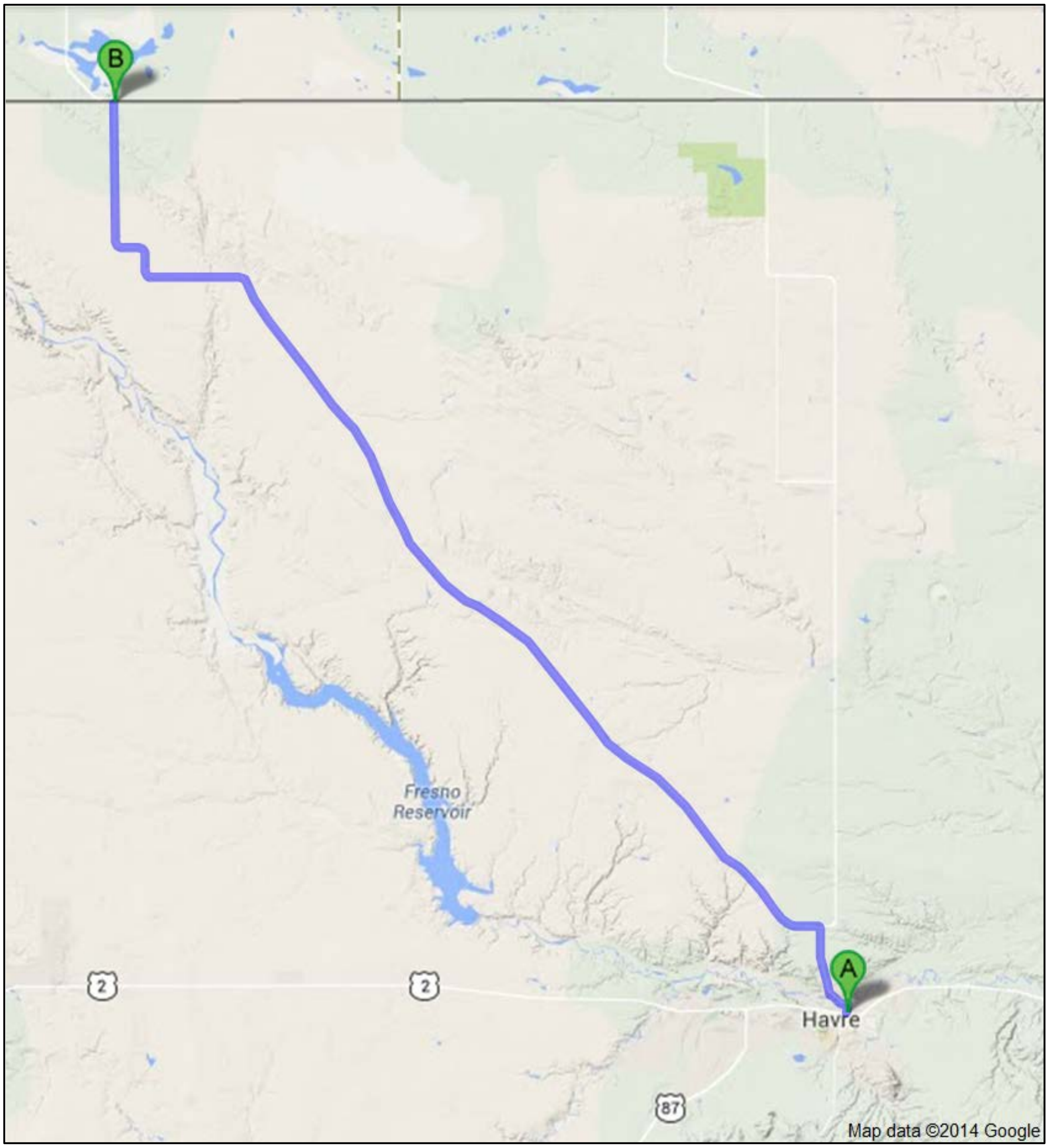

Figure 87: Map of Secondary Highway 232 Corridor between US 2 and Wild Horse

Source: Google (2014a)

8.1.2 The Wild Horse Port of Entry

In 2012, the Port of Wild Horse was the third largest border crossing within the ICED 1 Study Area, in terms of AADT. With an average of 160 vehicles per day (in both directions combined, northbound and southbound), it was well behind Sweet Grass (1,790 vehicles a day with three southbound inspection lanes for passenger vehicles and two lanes for trucks) and Raymond (290 vehicles, with three southbound inspection lanes). Overall, the port accounted for about 2.2 percent of all southbound crossings between Canada and Montana (BTS 2013), and 2.9 percent of all northbound crossings (Statistics Canada 2013).

Wild Horse is a two-lane permit port[49] open from 8 a.m. to 9 p.m. during summer time (between May 15 and September 30 in the U.S., and between April 29 and October 31 in Canada) and between 8 a.m. and 5 p.m. during the rest of the year[50]. An aerial view of the port is provided in Figure 88.

Data on wait times at the Port of Wild Horse are not available. Delays are expected to be minimal given the low traffic volumes in relation to Sweet Grass which has three additional inspection lanes handling more than ten times as much inbound traffic, or Raymond which has one additional inspection lane with double the amount of inbound traffic.

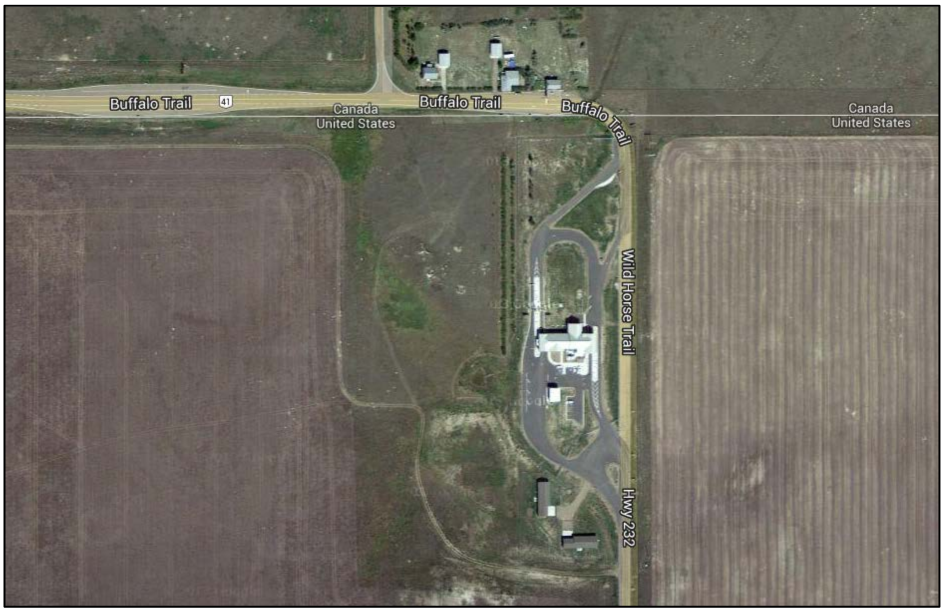

Figure 88: Aerial View of Wild Horse POE

Source: Google (2013b)

8.1.3 Secondary Highway 232

Traffic data in the Havre to Wild Horse corridor are summarized in Table 34 (AADT) and Table 35 (Truck AADT, including all truck types; and Large Truck AADT, including trucks in categories 8 to 13 of FHWA's vehicle classification system).

Data at 10 individual count sites are provided, along with a simple (non-weighted) corridor average and a weighted corridor average, where distances between count sites are used as weights.

---

[49] Permit ports do not have the infrastructure to off-load cargo for examinations. Commercial shipments that require a formal entry must be pre-approved by the Area Port Director to enter through the port.

[50] Service hours seem to vary slightly from year to year. Thus, in 2013, U.S. Customs and Border Patrol kept the summer hours running through October 31.

Overall, between 1998 and 2012, AADT in the corridor grew at an average annual rate of 1.8 percent based on the simple, non-weighted average. This growth estimate, however, masks annual fluctuations, as well as important variations across segments. On a weighted average basis, traffic grew at an average annual rate of 0.3 percent between 1998 and 2012, and declined in recent years, between 2008 and 2012.

Traffic in the corridor is fairly balanced between the southbound and northbound directions, but the share of southbound traffic declined in recent years. In 2012, only 48 percent of total traffic at the Port of Wild Horse (Automatic Traffic Recorder Station A-134) was southbound, compared to 63 to 65 percent between 1998 and 2005.

Table 34: Traffic Counts in the Havre to Wild Horse Highway Corridor for Selected Years, S-232

Site ID	Section Description	Departmental Route	Section Length (miles)	AADT			
				1998*	2008	2011	2012
2-14	JCT County Road 250 N	S-232	4.934	120	130	170	160
2-3	JCT County Road 230 N	S-232	6.088	160	210	220	180
2-2	JCT County Road 160 N	S-232	8.467	230	250	270	180
2-1	JCT County Road 50 N	S-232	15.582	320	370	370	320
4A-20	JCT S-233	S-232	5.154	370	400	500	400
4A-19	JCT 31st Street N	S-232	0.918	620	620	760	630
4A-66	JCT U-5711 (5th Street N)	S-232	1.641	890	1,030	1,180	910
4A-54	JCT 7th AVE / 5th Street N	U-5711	0.390	1,520	1,410	2,260	1,780
4A-53	JCT 2nd Street N	U-5711	0.174	2,810	3,400	3,530	3,310
4A-52	JCT N-1 (1st Street)	U-5711	0.193	2,860	3,130	4,870	4,830
Simple Corridor Average			**43.541**	**990**	**1,095**	**1,413**	**1,270**
Weighted Corridor Average				**323**	**364**	**411**	**338**

*Note: * Data may be incomplete*
Source: MDT (2013a)

Table 35: Truck Traffic in the Havre to Wild Horse Highway Corridor for Selected Years, S-232

Site ID	Section Description	Truck AADT (Vehicle Types 5 to 13)**				Large Truck AADT (Vehicle Types 8 to 13)**			
		1998*	2008	2011	2012	1998*	2008	2011	2012
2-14	JCT County Road 250 N	25	25	25	21	0	15	14	11
2-3	JCT County Road 230 N	0	25	25	21	0	15	14	11
2-2	JCT County Road 160 N	0	25	25	21	0	15	14	11
2-1	JCT County Road 50 N	69	25	25	21	0	15	14	11
4A-20	JCT S-233	69	25	25	21	0	15	14	11
4A-19	JCT 31st Street N	112	85	85	91	0	55	55	60
4A-66	JCT U-5711 (5th Street N)	194	85	85	91	0	55	55	60
4A-54	JCT 7th AVE / 5th Street N	0	150	150	150	0	60	60	60
4A-53	JCT 2nd Street N	0	150	150	150	0	60	60	60
4A-52	JCT N-1 (1st Street)	0	150	150	150	0	60	60	60
Simple Corridor Average		**47**	**75**	**75**	**74**	**0**	**37**	**36**	**36**
Weighted Corridor Average		**45**	**31**	**31**	**27**	**0**	**18**	**17**	**15**

*Note: * Data may be incomplete; ** In FHWA vehicle classification*
Source: MDT (2013a)

Additional data from MDT's continuous Automatic Traffic Recorder at the Port of Wild Horse (Station A-134) are shown in the charts and table below. Figure 89 suggests strong seasonal variations. In 2012, AADT peaked in the months of July and August, at 150 percent and 170 percent of the annual average respectively. Traffic was lowest in January and December, at 55 percent and 70 percent of the annual average, respectively. Figure 90 indicates that traffic was highest on Fridays and Saturdays, in particular in summer months. In 2012, the largest AADT was observed on Saturdays in August, with 324 vehicles (compared to an annual average of 158, rounded up to 160 in Table 34). Table 36 provides estimates of annual peak hourly volumes. In 2012, 36.7 percent of daily traffic was in the busiest hour (58 vehicles). The traffic volume recommended for design (the 30th highest hour) was 36 vehicles per hour.

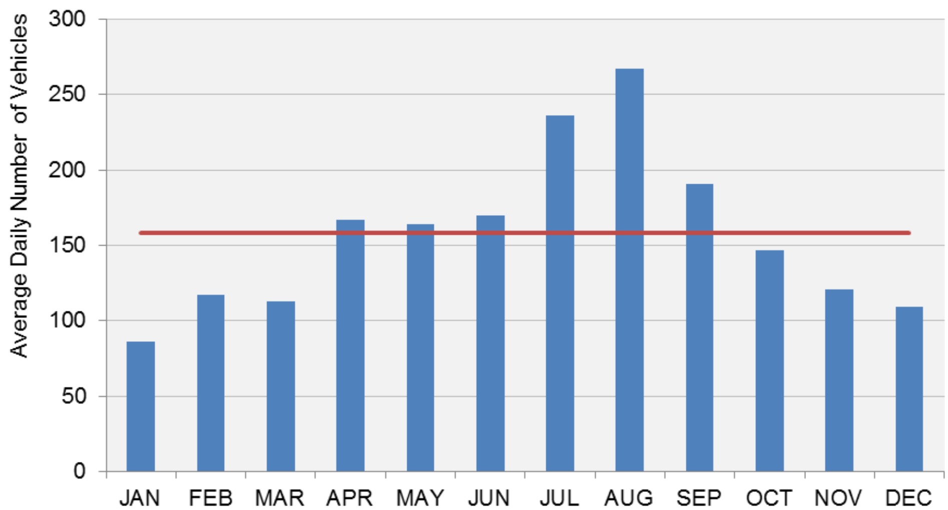

Figure 89: Average Daily Traffic by Month in the S-232 Corridor in 2012 (Station A-134)

Source: MDT (2012a)

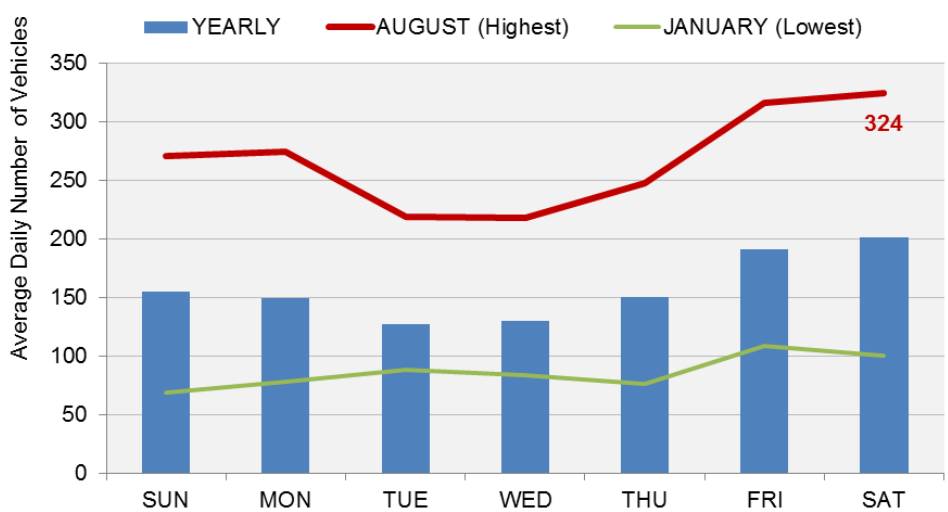

Figure 90: Average Daily Traffic by Day of the Week in the S-232 Corridor in 2012 (Station A-134)

Source: MDT (2012a)

Table 36: Yearly Peak Hour Volumes in the S-232 Corridor (Station A-134 Only)

Year	AADT	Highest Hour		Design Hour	
		Volume	Percent	Volume	Percent
2009	123	43	35.0%	29	23.6%
2010	152	44	28.9%	32	21.1%
2011	168	47	28.0%	35	20.8%
2012	158	58	36.7%	36	22.8%

Source: MDT (2012a)

Data from MDT's Congestion Management System (CoMS) are summarized in Table 37 below. Note that these data could not be updated for this study. Based on 2007 traffic data, the S-232 corridor operates at LOS A, with a Congestion Index of 93. Both measures are described in Appendix I.

Table 37: Level of Service and Congestion Index in the S-232 Corridor

Route	From	To	LOS	Congestion Index
S-232	Havre	Wild Horse	A	93

Note: Based on 2007 traffic; excluding segments within urban areas (i.e., Havre)
Source: MDT (2013c)

Table 38 summarizes pavement conditions in the corridor, using four different performance measures: Ride Index, Rut Index, Alligator Crack Index (ACI), and Miscellaneous Cracking Index (MCI). All measures suggest that pavement conditions are either good or fair (see Appendix I).

Table 38: Pavement Condition by Highway Segment in the S-232 Corridor

Begin Milepost	End Milepost	Length (miles)	Pavement Width	Ride Index	Rut Index	ACI	MCI
10.2	17.2	7.0	23.3	72.9	67.9	94.5	97.2
17.2	24.2	7.0	24.0	71.0	72.4	98.5	96.6
24.2	29.1	5.0	24.0	74.5	77.1	98.8	91.6
29.1	34.1	5.0	25.0	73.9	75.7	99.8	91.2
34.1	43.5	9.4	29.0	80.2	77.2	99.4	94.5
Corridor		**33.3**	**25.4**	**74.9**	**74.0**	**98.2**	**94.6**

Source: MDT (2013d)

Annual crash data by severity are presented in Table 39. A total of 69 crashes occurred within the S-232 corridor between 2003 and 2012, including two fatal accidents[51]. The data do not suggest any deterioration in safety performance over time.

Table 39: Number of Accidents by Severity in the S-232 Corridor, 2003 – 2012

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	TOTAL
Fatal Accident							1	1			**2**
Incapacitating Injury Accident			3			1	1				**5**
Non-Incapacitating Evident Injury Accident	1	3	4	2	1	1	3	1			**16**
Non-Injury Accident (Property-Damage-Only)	4	6	6	3	6	6	3	6	3	2	**45**
Possible Injury Accident							1				**1**
TOTAL	**5**	**9**	**13**	**5**	**7**	**8**	**9**	**8**	**3**	**2**	**69**

Source: MDT (2013e)

Crash data by accident type and severity are provided in Table 40 below. Nearly 40 percent of all accidents were rollovers; and both fatalities and all incapacitating injuries were the result of rollover accidents. Figure J-1 in Appendix J indicates that most accidents occurred in the southern end of the corridor, including both fatal accidents.

Table 40: Number of Accidents by Accident Type and Severity in the S-232 Corridor

	Domestic Animal	Fixed Object	Lost Control	Rear-End	Right Angle	Roll Over	Sideswipe, Opposite Direction	Sideswipe, Same Direction	Wild Animal	TOTAL
Fatal Accident						2				**2**
Incapacitating Injury Accident						5				**5**
Non-Incapacitating Evident Injury Accident	1	5				10				**16**
Non-Injury Accident (Property- Damage-Only)	2	13	1	5	3	9	1	2	9	**45**
Possible Injury Accident						1				**1**
TOTAL	**3**	**18**	**1**	**5**	**3**	**27**	**1**	**2**	**9**	**69**

Source: MDT (2013e)

[51] Both fatal accidents were roll-overs. Excessive speed ("Too Fast for Conditions" and "Exceeded Stated Speed Limit") was mentioned as a contributing factor in both; "Under the Influence of Drugs" and "Under the Influence of Alcohol" contributed to one.

8.2 US Highway 191 between US 2 and Morgan

Existing conditions in the US 191 corridor are presented in this section, starting with an overview of the corridor (Section 8.2.1), followed by a description of the border crossing (Section 8.2.2) and a summary of traffic and highway infrastructure conditions (Section 8.2.3).

8.2.1 Corridor Overview

The US 191 corridor is located within Phillips County, in Northern Montana. It connects US 2 in Malta, MT to the Port of Morgan (Figure 91), for a total length of about 54 miles.

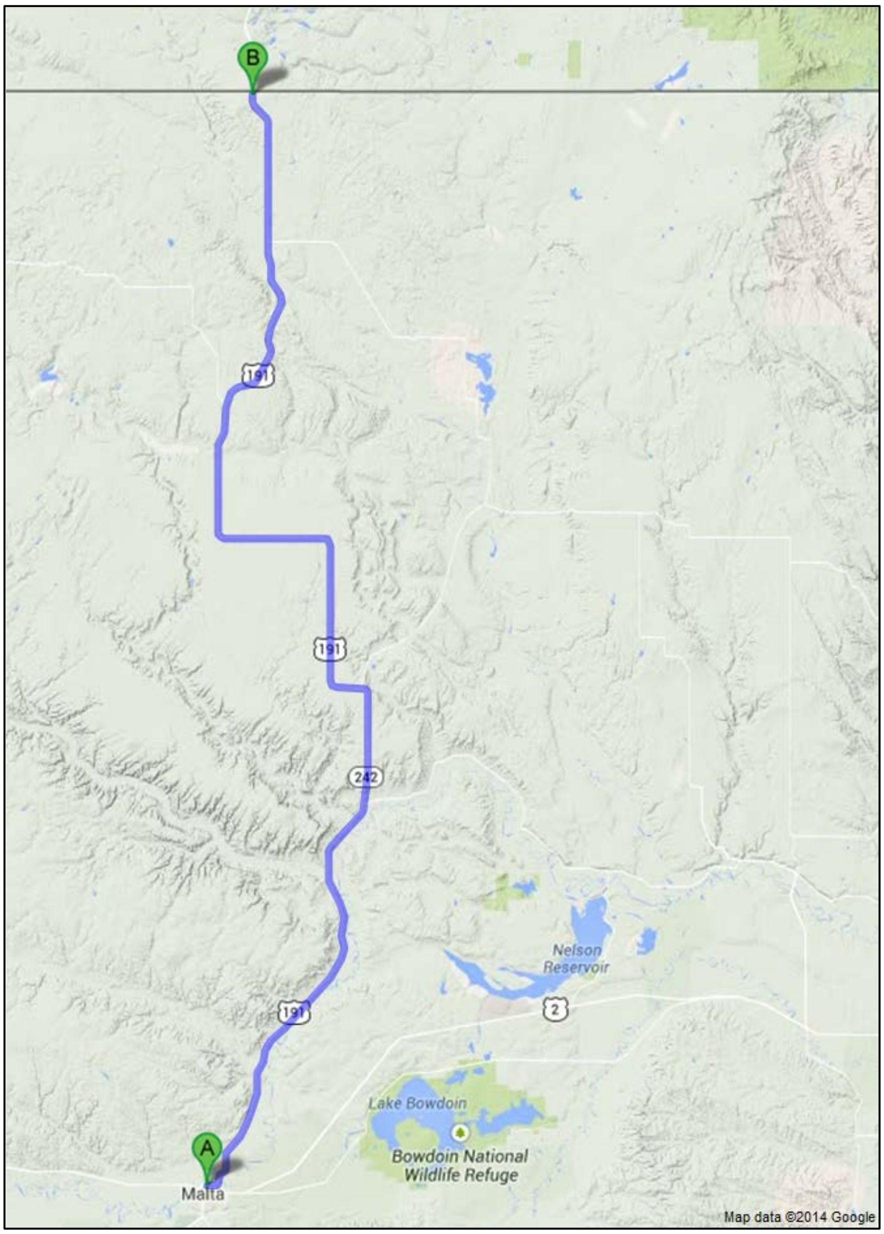

Figure 91: Map of US Highway 191 Corridor between US 2 and Morgan

Source: Google (2014b)

US 191 is a Rural Principal Arterial, with two lanes (one lane in each direction), an average pavement width of 28.8 feet, and two- to three-foot shoulders. Pavement conditions are generally good, and the facility currently operates at LOS A.

Across the border, in Saskatchewan, US 191 continues as Secondary Highway 4, an Arterial (Class 2), with one lane in each direction and two to three-foot shoulders. Highway 4 connects to Trans-Canada Highway in Swift Current, about 95 miles north of Morgan.

8.2.2 The Port of Entry at Morgan

The Port of Morgan is a permit port that operates between the hours of 8 a.m. and 9 p.m. from June 1st through September 15 and between 9 a.m. and 6 p.m. the rest of the year. On the Canadian side, southbound, the Port of Monchy is open between 8 a.m. and 9 p.m. from June 1st through September 15, with more limited hours during the remainder of the year (9 a.m. to 6 p.m. from the second Sunday in March to May 31 and from September 16 to the first Saturday in November; and 10 a.m. to 7 p.m. from the first Sunday in November to the second Saturday in March).

An aerial view of the port is provided in Figure 92, below.

Figure 92: Aerial View of Morgan POE

Source: Google (2013d)

In 2012, the Port of Morgan was the fifth largest border crossing within the ICED 1 Study Area, in terms of AADT. With an average of 70 vehicles per day, it came behind Sweet Grass, Raymond, Wild Horse, and Turner. The port accounted for about one percent of all southbound crossings between Canada and Montana (BTS 2013), and about one percent of all northbound crossings (Statistics Canada 2013).

Data on wait times at the Port of Morgan are not available; but delays are expected to be minimal given the low traffic volumes compared to Sweet Grass or Raymond.

8.2.3 US Highway 191

Recent traffic counts in the Malta to Morgan Highway Corridor are provided for six count sites in Table 41 and Table 42.

Between 1998 and 2012, corridor AADT fell at an average annual rate of 1.1 percent (non-weighted average). As in the S-232 corridor, this estimate masks annual fluctuations and important variations across segments. On a weighted average basis, traffic fell at an average annual rate of 1.2 percent between 1998 and 2012 and 2.4 percent between 2008 and 2012. Traffic at the port, however, grew at an annualized rate of 8.8 percent (from 50 to 70 vehicles).

The distribution of total traffic between the southbound and northbound directions is fairly balanced. As in the S-232 corridor, the share of southbound traffic declined in recent years. Thus, in 2012, exactly 50 percent of total traffic at Morgan (Automatic Traffic Recorder Station A-135) was southbound, against 55 to 61 percent during the period from 1998 to 2005.

Table 41: Traffic Counts in the Malta to Morgan Highway Corridor for Selected Years, US 191

Site ID	Section Description	Section Length (miles)	AADT			
			1998*	2008	2011	2012
1-4	JCT Border Road	6.213	80	50	70	70
1-3	JCT Local Road	9.682	100	110	110	100
1-2	JCT Local Road	3.234	130	130	130	120
1-1	JCT S-208	11.545	170	140	130	120
3-6	JCT Hopglan Addition	22.449	320	300	300	270
3-19	JCT N-1 West of Malta	0.861	860	900	850	740
Non-Weighted Corridor Average		**53.984**	**277**	**272**	**265**	**237**
Weighted Corridor Average			**218**	**202**	**202**	**183**

*Note: * Data may be incomplete*
Source: MDT (2013a)

Table 42: Truck Traffic in the Malta to Morgan Highway Corridor for Selected Years, US 191

Site ID	Section Description	Truck AADT (Vehicle Types 5 to 13)**				Large Truck AADT (Vehicle Types 8 to 13)**			
		1998*	2008	2011	2012	1998*	2008	2011	2012
1-4	JCT Border Road	27	15	12	16	0	10	6	12
1-3	JCT Local Road	27	15	12	16	0	10	6	12
1-2	JCT Local Road	27	15	12	16	0	10	6	12
1-1	JCT S-208	27	15	12	16	0	10	6	12
3-6	JCT Hopglan Addition	47	22	22	41	0	15	15	33
3-19	JCT N-1 West of Malta	47	22	22	41	0	15	15	33
Non-Weighted Corridor Average		**34**	**17**	**15**	**24**	**0**	**12**	**9**	**19**
Weighted Corridor Average		**36**	**18**	**16**	**27**	**0**	**12**	**10**	**21**

*Note: * Data may be incomplete; ** In FHWA vehicle classification*
Source: MDT (2013a)

Additional data from MDT's Automatic Traffic Recorder at the Port of Morgan (Station A-135) are shown in Figures 93 and 94, and Table 43. Figure 93 (2012 data) suggests strong seasonal variations, with AADT peaking in August at about 165 percent of the annual average. As in the S-232 corridor, traffic was lowest in January, at 70 percent of the annual average. Figure 94 indicates traffic was highest on Fridays: the largest daily traffic volumes were observed on Fridays in August, with 139 vehicles (compared to an annual average of 68 vehicles, rounded up to 70 in Table 41). As can be seen in Table 43, in 2012, over half of daily traffic was in the busiest hour (51.5 percent of daily volume, or 35 vehicles). The traffic volume recommended for design (the 30th highest hour) was 20 vehicles per hour.

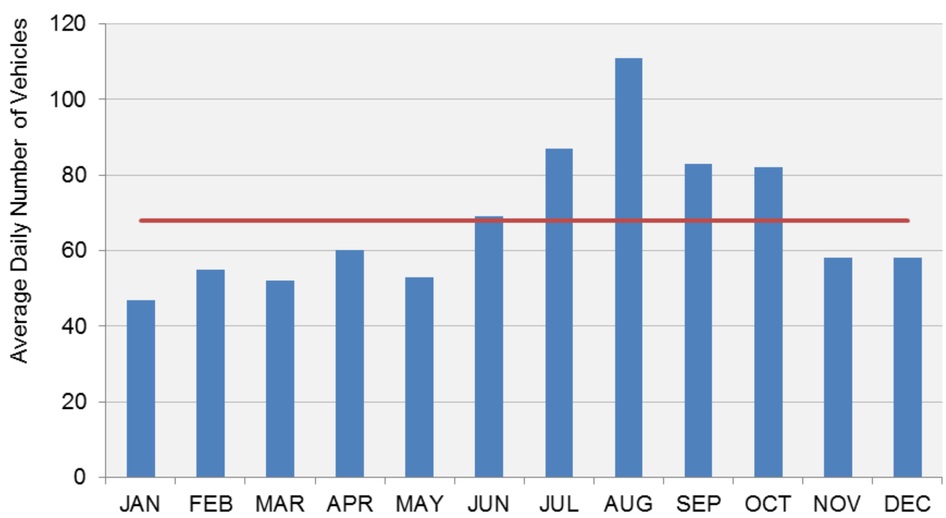

Figure 93: Average Daily Traffic by Month in the US 191 Corridor (Station A-135 Only)

Source: MDT (2012a)

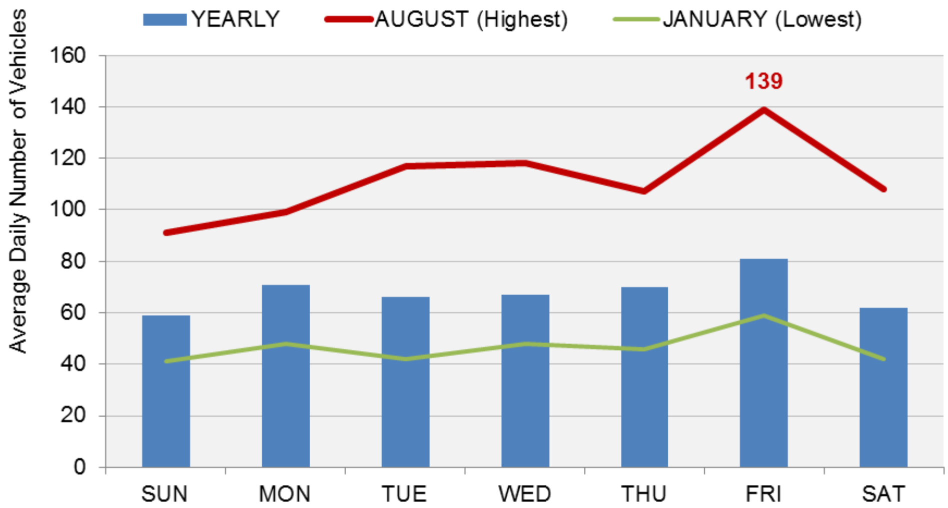

Figure 94: Average Daily Traffic by Day of the Week in the US 191 Corridor (Station A-135 Only)

Source: MDT (2012a)

Table 43: Yearly Peak Hour Volumes in the US 191 Corridor (Station A-135 Only)

Year	AADT	Highest Hour		Design Hour	
		Volume	Percent	Volume	Percent
2009	54	36	66.7%	15	27.8%
2010	75	28	37.3%	19	25.3%
2011	74	33	44.6%	18	24.3%
2012	68	35	51.5%	20	29.4%

Source: MDT (2012a)

CoMS data for the US 191 corridor are summarized in Table 44 below. Based on 2007 traffic data, the corridor operates at LOS A, with a Congestion Index of 95.

Table 44: Level of Service and Congestion Index in the US 191 Corridor

Route	From	To	LOS	Congestion Index
US 191	Malta	Morgan	A	95

Note: Based on 2007 traffic; excluding segments within urban areas
Source: MDT (2013c)

Current pavement conditions in the corridor are summarized in Table 45. All measures suggest that, for all highway segments, pavement conditions are either good or fair (see Appendix I).

Table 45: Pavement Condition by Highway Segment in the US 191 Corridor

Begin Milepost	End Milepost	Length (miles)	Pavement Width	Ride Index	Rut Index	ACI	MCI
0.0	7.0	7.0	30.0	81.7	75.0	99.5	97
7.0	18.2	11.2	24.0	68.8	64.7	90.2	94.9
18.2	29.2	11.0	31.0	79.2	79.3	99.4	97.9
29.2	38.1	9.0	31.0	81.4	76.7	98.7	92.9
38.1	43.1	5.0	31.0	78	75.9	96.6	89.9
43.1	54.2	11.1	28.0	77.3	76.8	99.3	97.5
Corridor		**54.2**	**28.8**	**77.2**	**74.5**	**97.1**	**95.5**

Source: MDT (2013d)

Annual crash data for the US 191 corridor can be found in Table 46. Between 2003 and 2012, a total of 45 crashes occurred in the corridor, including three fatal accidents[52]. No deterioration in safety performance is apparent in the data.

Table 46: Number of Accidents by Severity in the US 191 Corridor, 2003 – 2012

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	TOTAL
Fatal Accident							1		2		**3**
Incapacitating Injury Accident	2		1								**3**
Non-Incapacitating Evident Injury Accident	1	1	1	2	2				1	1	**9**
Non-Injury Accident (Property-Damage-Only)	5	2	2	2		1	6	3		2	**23**
Possible Injury Accident		1	1					1	3	1	**7**
TOTAL	**8**	**4**	**5**	**4**	**2**	**1**	**7**	**4**	**6**	**4**	**45**

Source: MDT (2013e)

Table 47 provides a breakdown of crash data by accident type and severity. As in the S-232 corridor, nearly 40 percent of all accidents were rollovers, and all fatalities and incapacitating injuries were caused by rollovers. Figure J-2 in Appendix J shows that the majority of accidents occurred in the southern half of the corridor, where traffic volumes are generally higher.

[52] All three fatal crashes were roll-overs. “Disregard Traffic Mark/Sign/Signal” and “Careless Driving” were mentioned as contributing factors in all three; “Under the Influence (of Drugs or Alcohol)” in two.

Table 47: Number of Accidents by Accident Type and Severity in the US 191 Corridor

	Domestic Animal	Fixed Object	Left Turn, Opposite Direction	Not Fixed Object Or Debris	Parked Vehicle	Rear-End	Right Angle	Right Turn, Opposite Direction	Roll Over	Sideswipe, Opposite Direction	Sideswipe, Same Direction	Wild Animal	TOTAL
Fatal Accident									3				**3**
Incapacitating Injury Accident									3				**3**
Non-Incapacitating Evident Injury Accident		2				1			5		1		**9**
Non-Injury Accident (Property- Damage-Only)	2	9	1	1	1		1	1	3	1	1	2	**23**
Possible Injury Accident	2	1				1			3				**7**
TOTAL	**4**	**12**	**1**	**1**	**1**	**2**	**1**	**1**	**17**	**1**	**2**	**2**	**45**

Source: MDT (2013e)

9 FUTURE CONDITIONS AND ADEQUACY OF EXISTING HIGHWAY INFRASTRUCTURE

This chapter provides an assessment of future conditions (given the traffic projections presented in Chapter 7) and presents the research team's view on the adequacy of existing highway infrastructure.

9.1 Secondary Highway 232 between US 2 and Wild Horse

The traffic projections presented in Chapter 7 are summarized in Tables 48 and 49.

The corridor operates at LOS A under current conditions, as shown in Chapter 8 of this report. As can be seen in Table 48, the weighted AADT on this corridor could rise from 338 in 2012 to a potential 669 in 2032 with extended port service hours and TS&W harmonization. There could also be an increase in the percentage of heavy vehicles for the corridor, which may degrade operations.

Table 48: 2032 AADT Projections in the S-232 Corridor, by Highway Segment

Site ID	Section Description	2012 AADT	2032 AADT			2032 AADT with Extended Port Service Hours & TS&W Harmonization		
			Low	Most Likely	High	Low	Most Likely	High
2-15	JCT County Road 250 N	160	195	257	331	224	300	393
2-5	JCT County Road 230 N	180	203	257	319	220	278	351
2-6	JCT County Road 160 N	180	203	257	319	220	278	351
2-4	JCT County Road 50 N	320	361	457	567	390	495	625
4A-20	JCT S-233	400	451	571	709	488	618	781
4A-19	JCT 31st Street N	630	710	900	1,116	769	974	1,230
4A-66	JCT U-5711 (5th Street N)	910	1,026	1,300	1,612	1,110	1,406	1,776
4A-54	JCT 7th AVE / 5th Street N	1,780	2,006	2,543	3,153	2,172	2,751	3,474
4A-53	JCT 2nd Street N	3,310	3,731	4,729	5,863	4,039	5,115	6,460
4A-52	JCT N-1 (1st Street)	4,830	5,444	6,901	8,556	5,894	7,464	9,427
Simple Corridor Average		**1,270**	**1,433**	**1,817**	**2,254**	**1,553**	**1,968**	**2,487**
Weighted Corridor Average		**338**	**383**	**487**	**605**	**416**	**529**	**669**

Source: HDR Analysis

Table 49: Percentage of Trucks in Total AADT in the S-232 Corridor, by Highway Segment

Site ID	Section Description	2012 Percent Trucks	2032 Percent Trucks			2032 Percent Trucks with Extended Port Service Hours & TS&W Harmonization		
			Low	Most Likely	High	Low	Most Likely	High
2-15	JCT County Road 250 N	13%	10%	11%	14%	10%	12%	16%
2-5	JCT County Road 230 N	12%	10%	11%	13%	10%	12%	15%
2-6	JCT County Road 160 N	12%	10%	11%	13%	10%	12%	15%
2-4	JCT County Road 50 N	7%	6%	6%	7%	6%	7%	8%
4A-20	JCT S-233	5%	4%	5%	6%	5%	5%	7%
4A-19	JCT 31st Street N	14%	12%	14%	16%	13%	15%	19%
4A-66	JCT U-5711 (5th Street N)	10%	9%	10%	11%	9%	10%	13%
4A-54	JCT 7th AVE / 5th Street N	8%	7%	8%	9%	7%	9%	11%
4A-53	JCT 2nd Street N	5%	4%	4%	5%	4%	5%	6%
4A-52	JCT N-1 (1st Street)	3%	3%	3%	3%	3%	3%	4%
Simple Corridor Average		**6%**	**5%**	**6%**	**7%**	**5%**	**6%**	**7%**
Weighted Corridor Average		**8%**	**7%**	**8%**	**9%**	**7%**	**8%**	**10%**

Source: HDR Analysis

These potential changes in traffic should not degrade the weighted traffic operations below free-flow conditions (LOS A). Individual locations within the corridor may experience higher degradation in operations than the overall weighted average operations.

Including extended port hours and harmonization, existing pavement conditions may worsen as compared to non-modified future traffic projections. Roadway elements, such as pavement conditions, can impact operations. Should pavement and geometric elements of the roadway be maintained, the existing infrastructure will be adequate to handle future traffic volumes.

Projections of highest hourly traffic[53] at Count Site 2-15 (JCT County Road 250 N) in relation to LOS A[54] are shown in Figures 95 and 96.

Only under the most aggressive growth scenario (Upper 10 percent forecast, with Extended Port Service Hours & TS&W Harmonization) would operations during the busiest hour deteriorate below free-flow conditions within the forecast period (in 2028).

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[53] Based on AADT projections, assuming that the share of total traffic occurring in the busiest hour will remain constant

[54] 130 vehicles per hour, determined with default values for a Class 1 Two-lane Rural Highway from TRB (2000), Exhibit 12-15

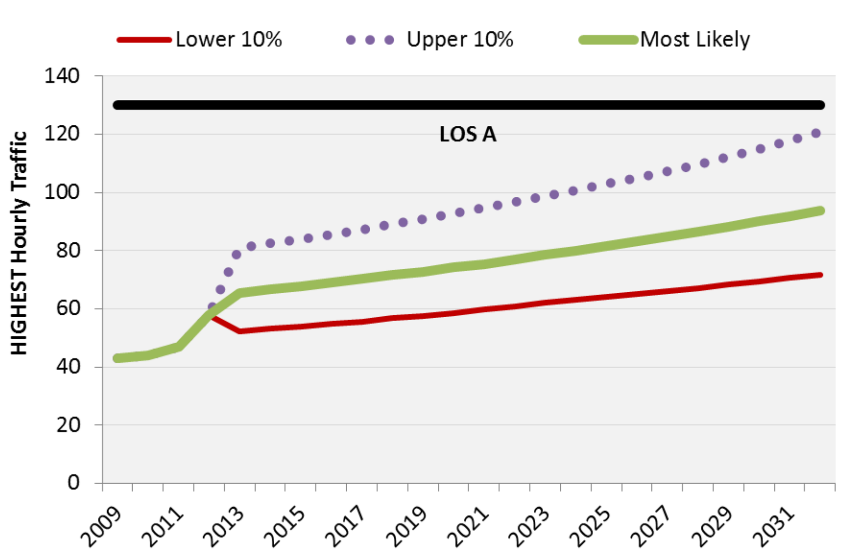

Figure 95: AADT Projections in the S-232 Corridor in Relation to LOS A

Source: HDR Analysis and TRB (2000)

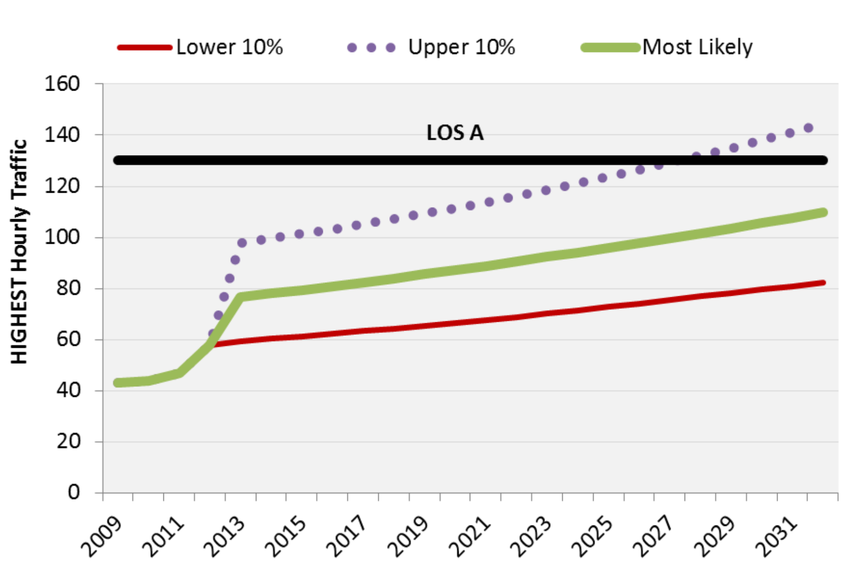

Figure 96: AADT Projections in the S-232 Corridor in Relation of LOS A, with Extended Port Service Hours & TS&W Harmonization

Source: HDR Analysis and TRB (2000)

9.2 US Highway 191 between US 2 and Morgan

The traffic projections for the US 191 corridor are summarized in Tables 50 and 51 below.

Table 50: 2032 AADT Projections in the US 191 Corridor by Highway Segment

Site ID	Section Description	2012 AADT	2032 AADT			2032 AADT with Extended Port Service Hours & TS&W Harmonization		
			Low	Most Likely	High	Low	Most Likely	High
1-4	JCT Border Road	70	80	106	134	94	126	159
1-3	JCT Local Road	100	110	132	161	117	143	174
1-2	JCT Local Road	120	133	158	193	141	171	208
1-1	JCT S-208	120	133	158	193	141	171	208
3-6	JCT Hopglan Addition	270	298	357	434	317	386	469
3-19	JCT N-1 West of Malta	740	818	977	1,189	868	1,057	1,286
Simple Corridor Average		**237**	**262**	**315**	**384**	**280**	**343**	**417**
Weighted Corridor Average		**183**	**202**	**243**	**296**	**216**	**264**	**322**

Source: HDR Analysis

Table 51: Percentage of Trucks in Total AADT in the US 191 Corridor, by Highway Segment

Site ID	Section Description	2012 Percent Trucks	2032 Percent Trucks			2032 Percent Trucks with Extended Port Service Hours & TS&W Harmonization		
			Low	Most Likely	High	Low	Most Likely	High
1-4	JCT Border Road	23%	16%	20%	26%	16%	20%	28%
1-3	JCT Local Road	16%	14%	16%	18%	14%	17%	20%
1-2	JCT Local Road	13%	12%	13%	15%	12%	14%	17%
1-1	JCT S-208	13%	12%	13%	15%	12%	14%	17%
3-6	JCT Hopglan Addition	15%	13%	15%	17%	13%	16%	19%
3-19	JCT N-1 West of Malta	6%	5%	5%	6%	5%	6%	7%
Simple Corridor Average		**10%**	**9%**	**10%**	**12%**	**9%**	**11%**	**13%**
Weighted Corridor Average		**15%**	**13%**	**14%**	**17%**	**13%**	**15%**	**19%**

Source: HDR Analysis

The corridor operates at LOS A under current conditions, as shown in Chapter 8 of this report. The weighted AADT on this corridor could rise from 183 in 2012 to a potential 322 in 2032 with extended port service hours and TS&W harmonization, as shown in Table 50. There could also be an increase in the percentage of heavy vehicles for the corridor, which may degrade operations. These potential changes in traffic should not degrade the weighted traffic operations below free-flow conditions (LOS A). Individual locations within the corridor may experience higher degradation in operations than the overall weighted average operations.

Including extended port hours and harmonization, existing pavement conditions may worsen as compared to non-modified future traffic projections. Roadway elements, such as pavement conditions, can impact operations. Should pavement and geometric elements of the roadway be maintained, the existing infrastructure will be adequate to handle future traffic volumes.

Projections of highest hourly traffic at Count Site 1-4 (JCT Border Road) in relation to LOS A are shown in Figures 97 and 98 below. Throughout the forecast period, under all scenarios, operations during the busiest hour are expected to remain below highway capacity.

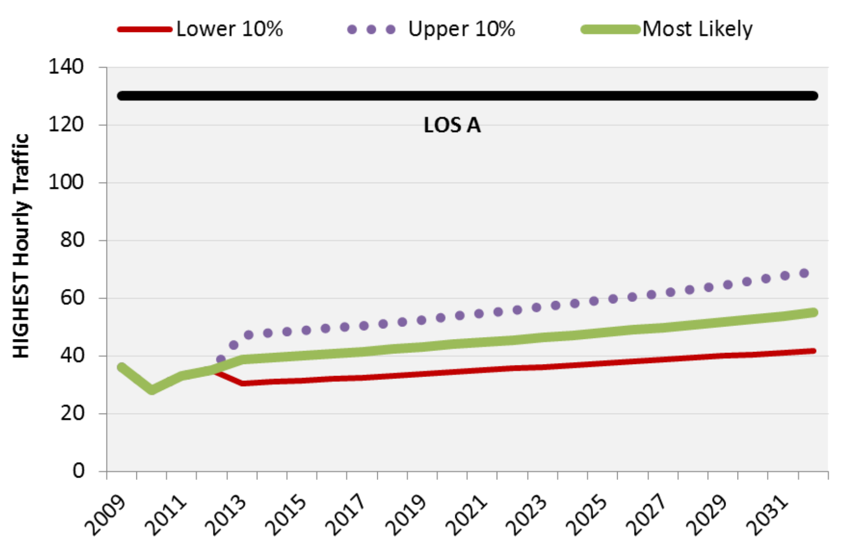

Figure 97: AADT Projections in the US 191 Corridor in Relation to LOS A

Source: HDR Analysis and TRB (2000)

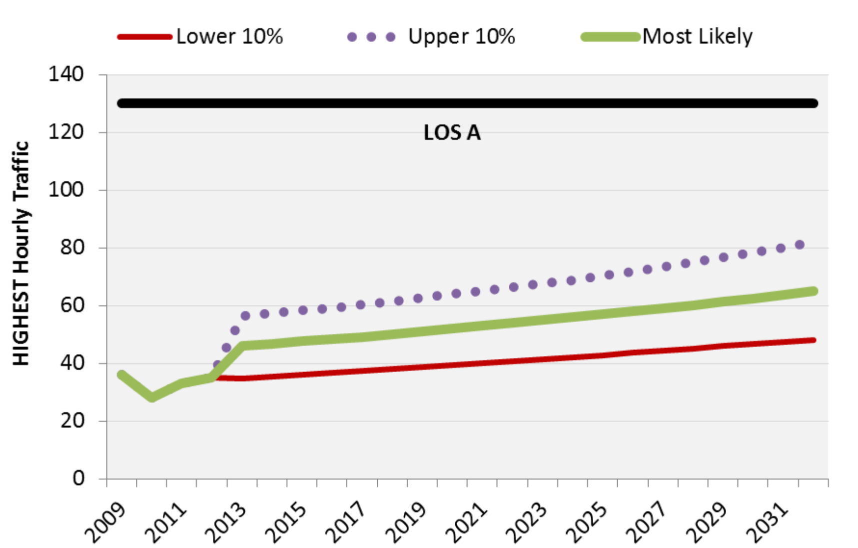

Figure 98: AADT Projections in the US 191 Corridor in Relation of LOS A, with Extended Port Service Hours & TS&W Harmonization

Source: HDR Analysis and TRB (2000)

10 SUMMARY OF FINDINGS AND CONCLUSIONS

The purpose of this study was to determine whether highway infrastructure in Montana is adequate to support future expected growth in traffic resulting from economic development in Canada, and a number of potential changes in border operations, industry structure and freight-related policy.

Historical data on cross-border traffic, empirical findings from existing research, interviews with selected industry representatives and subject matter experts, as well as professional judgment, were used to:

1. Provide an overview of the regional economy, highlighting threats and opportunities for future economic development and growth in international trade;

2. Develop forecasts of cross-border commodity flows and commercial traffic under alternative scenarios and economic growth assumptions;

3. Document existing conditions along two highway corridors connecting US 2 with the Canadian border, namely the S-232 corridor between US 2 and Wild Horse, and the US 191 corridor between US 2 and Morgan; and

4. Assess whether existing highway infrastructure along these corridors is adequate to accommodate future expected traffic levels.

Based on the above, it was found that:

1. The region, overall, was better able to weather the effects of the Great Recession than other states and provinces. GDP growth in Alberta and Saskatchewan was particularly strong in recent years. Growth in Montana was more subdued, but the state generally fared better than the rest of the Nation, in particular in terms of income growth and unemployment. While the economies of Alberta and Saskatchewan have experienced rapid structural shifts in the past decade, the structure of Montana's economy has remained relatively stable.

   The Mining, Quarrying and Oil and Gas Extraction sector has been the primary driver of economic growth in Alberta and Saskatchewan. Despite some uncertainty in relation to oil prices and pipeline capacity, growth in Alberta's oil sands is expected to continue at a solid rate. Growth prospects in oil production, potash production and uranium mining in Saskatchewan are also strong. In Montana, development of the Bakken formation has generated rapid employment and population growth in the East. Strong growth is expected in the Construction sector across the region, as a result of energy development and related infrastructure needs. Growth in manufacturing employment is expected to be relatively moderate in Alberta and Saskatchewan. A return to healthier growth is expected in Montana, partly as a result of energy development in the East.

U.S. imports from Canada through Montana POEs have decreased in value and volume since their pre-recession peak of 2008. Growth resumed after 2009, but total import value was about 30 percent lower in 2012 than four years earlier (and about 14 percent lower in tonnage). After a sharp decline in 2009, U.S. exports to Canada increased steadily in 2010 and 2011, and exceeded their pre-recession peak by over $2.0 billion in 2012.

2. Along with employment and income growth, development of the regional economy is expected to generate additional commodity flows and commercial traffic across the Montana – Canada border; in particular through increased U.S. exports of machinery and equipment to help support energy development in Alberta.

   Truck traffic at all POEs within the study area is expected to grow at an average annual rate of 1.4 percent between 2012 and 2032, to reach 1,310 vehicles daily at the end of the period (most likely forecast). Daily truck traffic could grow at a higher rate of 3.7 percent per year with a 10 percent probability to reach 2,060 vehicles a day in 2032. Commercial auto traffic at all ports within the study area is expected to grow at an average annual rate of 1.9 percent (most likely forecast), and within an 80 percent prediction interval bounded by 870 and 2,030 vehicles a day in 2032.

   The harmonization of truck size and weight regulations may affect traffic volumes. Harmonization to Canadian standards could reduce the total number of trucks on Montana's highways by 3 to 20 percent. Extension of service hours to 16-hours, 7-days-a-week, at the ports of Wild Horse and Morgan is expected to generate moderate changes in traffic at these ports: increases of 10 to 60 percent are expected for trucks, of 5 to 30 percent for cars. The highway infrastructure investments planned within the study area are limited in scope and would not have a measurable impact on future traffic volumes.

3. S-232, between US 2 and Wild Horse, is a Rural Major Collector with two lanes (one lane in each direction), an average pavement width of 25.4 feet, and limited or no shoulders. Pavement conditions are generally good, and the facility currently operates at LOS A (with average vehicle speeds at – or close to – posted speed limits). Safety performance has been stable in recent years (2003 – 2012). US 191, between US 2 and Morgan, is a Rural Principal Arterial with two lanes, an average pavement width of 28.8 feet, and two- to three-foot shoulders. Pavement conditions are generally good, and the facility operates at LOS A. Safety performance has also been stable over time.

4. Expected changes in traffic along both corridors of interest should not degrade the weighted traffic operations below free-flow conditions (LOS A), provided existing pavement and geometric conditions are maintained. Individual locations within the corridors may experience higher degradation in operations than the overall weighted average operations.

Traffic operations along the highway segments immediately adjacent to the ports are expected to remain above free-flow conditions through 2032. Only under the most aggressive growth scenario would traffic conditions south of Wild Horse deteriorate below LOS A in the busiest hour, in 2028.

Overall, in most likelihood, existing highway infrastructure will be adequate to handle the expected increase in total traffic, as well as the potential increase of truck traffic, for both corridors.

11 REFERENCES AND DATA SOURCES

Alberta Enterprise and Advanced Education, "Inventory of Major Projects." http://www.albertacanada.com/business/statistics/inventory-of-major-projects.aspx (last accessed November 6, 2013)

Association of American Railroads (AAR), "Railroads and Grain" [online publication], available at https://www.aar.org/keyissues/Documents/Background-Papers/Railroads-and-Grain.pdf (last accessed January 14, 2014), (August 2013), 9 pp.

Bakken Business Journal, "Oil Production Increases in Montana in 2012: Well Activity on the Rise for First Time since 2006." http://bakkenoilbiz.com/oil-drilling/oil-production-increases-in-montana-in-2012-well-activity-on-the-rise-for-first-time-since-2006/ (last accessed November 2, 2013)

Barkey, Patrick M., "Montana Economic Outlook: Smooth Sailing Toward a Cliff?" Economic Outlook, Bureau of Business and Economic Research, University of Montana (2013) 3 pp.

Barkey, Patrick M., "The Economic Impacts of Wild Horse Border Crossings Upgrades." Final Report prepared for Bear Paw Development Corporation, Bureau of Business and Economic Research, The University of Montana (March 2008), 19 pp.

BMO Capital Markets, "An Update on Provincial Economic and Fiscal Matters." Provincial Monitor (October 2013) 15 pp.

Canadian Wheat Board (CWB), "Dismantling the Canadian Wheat Board: What's at Stake?" Online Brochure, available at http://www.nfu.ca/sites/www.nfu.ca/files/Whats%20at%20stake.pdf (last accessed November 13, 2013)

Dong, Fengxia and Kyle Stiegert, "The Welfare Effects of State Trading Enterprises: the Case of U.S.-Canada Malting Barley Trade." Paper presented at the Western Agricultural Economics Association Annual Meeting, Denver, Colorado (July 13-16, 2003), 16 pp.

Energy Resources Conservation Board, "Alberta's Energy Reserves 2012 and Supply/Demand Outlook 2013–2022." ST98-2013, Calgary, Alberta, T2P 0R4 (2013) 282 pp.

Google, 2013a. "Map of Secondary Highway 232 Corridor between US 2 and Wild Horse" [online map data]. Mountain View, CA: Google Inc. http://maps.google.com (accessed November 2013)

Google, 2013b. "Aerial View of Wild Horse POE" [online map data]. Mountain View, CA: Google Inc. http://maps.google.com (accessed November 2013)

Google, 2013c. "Map of US Highway 191 Corridor between US 2 and Morgan" [online map data]. Mountain View, CA: Google Inc. http://maps.google.com (accessed November 2013)

Google, 2013d. “Aerial View of Morgan POE” [online map data]. Mountain View, CA: Google Inc. http://maps.google.com (accessed November 2013)

Google, 2014a. “Map of Secondary Highway 232 Corridor between US 2 and Wild Horse” [online map data]. Mountain View, CA: Google Inc. http://maps.google.com (accessed September 2014)

Google, 2014b. “Map of US Highway 191 Corridor between US 2 and Morgan” [online map data]. Mountain View, CA: Google Inc. http://maps.google.com (accessed September 2014)

Government of Alberta Ministry of Transportation, “Applications, Permits and Prorate.” http://www.transportation.alberta.ca/520.htm (last accessed November 26, 2013)

Government of Alberta, Employment and Immigration, “Alberta Modified Canadian Occupational Projection System (COPS) Outlook, 2013 – 2017, Industry Employment Outlook.” (2013) 3 pp.

Government of Saskatchewan, Ministry of the Economy, “Major Projects Inventory”, http://economy.gov.sk.ca/MajorProjects (last accessed October 10, 2013)

GTS Group International, “An Analysis of the Economic Impacts and Opportunities on Alberta’s Eastern Corridor Resulting from Upgrading Port of Entry – Wild Horse.” Final Report (March 8, 2008), 15 pp.

Harrison, Rob, “Harmonizing Truck Transportation.” Policy Harmonization and Adjustment in the North American Agricultural and Food Industry. Proceedings of the 5th Agricultural and Food Policy. Farm Foundation, Agricultural and Food Policy Systems Information Workshops (1999), 18 pp.

Johnson, Demcey D. and William W. Wilson, “Competition and Policy Conflicts in Canada-U.S. Barley Trade.” Journal of Agricultural and Resource Economics, 20(1): 64-81 (1995), 18 pp.

Johnson, Demcey D., “Single-Desk Selling of Canadian Barley: Price Pooling, Price Discrimination, and Systemic Costs.” Agricultural Economics Report No. 411, Department of Agricultural Economics, North Dakota State University (1999), 40 pp.

Johnson, Terry, “Energy Industries: A Real Boom?” Bureau of Business and Economic Research, University of Montana (2013) 2 pp.

Koo, Won W., Jeremy W. Mattson, Hyun J. Jin, Richard D. Taylor and Guedae Cho, “Effects of the Canadian Wheat Board on the U.S. Wheat Industry.” Prepared for U.S. Senator Kent Conrad, Agribusiness & Applied Economics Report No. 550, Center for Agricultural Policy and Trade Studies, Department of Agribusiness and Applied Economics, North Dakota State University (November 2004), 29 pp.

Montana Department of Commerce, Office of Trade and International Relations, Census and Economic Information Center, “2012 Montana Commodity Exports Summary.” (March 29, 2013) 1 page

Montana Department of Environmental Quality, Historical Energy Statistics, Petroleum Tables Workbook, 2012 Update, http://www.deq.mt.gov/Energy/HistoricalEnergy/default.mcpx (last accessed November 15, 2013).

Montana Department of Transportation (MDT), 2007. "Roadway System Performance." TranPlan 21 Policy Paper, available at http://www.mdt.mt.gov/publications/docs/brochures/tranplan21/roadwaysysperf.pdf (accessed December 2013)

Montana Department of Transportation (MDT), 2010, "Impact of Canadian Economic Development on Northern Montana Highways." Prepared by HDR Decision Economics, available at http://www.mdt.mt.gov/research/projects/mcs/canada_impact_nhwy.shtml (last accessed September 18, 2014)

Montana Department of Transportation (MDT), 2012a. "Montana's Automatic Traffic Recorders 2012" [online PDF document]. Traffic Data Collection and Analysis Section, http://www.mdt.mt.gov/publications/docs/datastats/atr/atrbook12.pdf (accessed November 2013)

Montana Department of Transportation (MDT), 2012b. "2012-2016 Statewide Transportation Improvement Program" [online PDF document]. Rail, Transit and Planning Division, http://www.mdt.mt.gov/pubinvolve/stip.shtml (accessed December 2013)

Montana Department of Transportation (MDT), 2013a. "Border Count Data: Average Annual Daily Traffic." [custom data tabulation]. Helena, MT: Rail, Transit and Planning Division MDT (provided March 6 2013)

Montana Department of Transportation (MDT), 2013b. "2012 Traffic by Sections Report." [online document]. Helena, MT http://www.mdt.mt.gov/other/traffcount/external/TRAFFIC_REPORTS/TBS-ON-SYSTEM_FINAL_6-12-13.PDF (last accessed November 25 2013)

Montana Department of Transportation (MDT), 2013c. "Level of Service and Congestion Index Information." [custom tabulation of 2008 data from the Congestion Management System], Helena, MT (provided April 2013)

Montana Department of Transportation (MDT), 2013d. "Pavement Conditions and Overall Performance Index." [custom data tabulation]. Pavement Analysis Division MDT (provided April 2013)

Montana Department of Transportation (MDT), 2013e. "Crash Data" [custom data tabulation] (provided April 2013)

Montana Department of Transportation (MDT), 2013f. "Impacts of Bakken Region Oil Development on Montana's Transportation and Economy." Prepared by Nicholas Brown, Hal Fossum, Alice Hecht, Chris Dorrington, and Doug McBroom (January 31, 2013) 32 pp., available at http://www.mdt.mt.gov/research/projects/pave/oil.shtml (last accessed January 8, 2014)

Montana Department of Transportation (MDT), 2014. “2014-2018 Statewide Transportation Improvement Program” [online PDF document]. Rail, Transit and Planning Division, http://www.mdt.mt.gov/pubinvolve/stip.shtml (accessed September 2014)

Morgan, Todd A., Charles E. Keegan III, Steven W. Hayes, and Colin B. Sorenso, “Montana’s Manufacturing Industry, Outlook for Continued Improvement.” Manufacturing Outlook, Bureau of Business and Economic Research, University of Montana (2013) 3 pp.

National Cooperative Highway Research Program, “Review of Canadian Experience with the Regulation of Large Commercial Motor Vehicles.” Report 671, Transportation Research Board, Washington D.C. (2010), 137 pp.

Oldham, Jennifer, “Montana Towns Struggle with Oil Boom Cost as Dollars Flee”, Bloomberg News, October 10, 2013, available at http://www.bloomberg.com/news/2013-10-10/montana-towns-struggle-with-oil-boom-cost-as-dollars-flee.html (last accessed 9/30/2014)

Organization of Economic Development and Cooperation, StatExtracts Database, http://stats.oecd.org/ (last accessed September 28, 2013)

Petroleum Human Resources Council of Canada, “The Decade Ahead: Labour Market Outlook to 2022 for Canada’s Oil and Gas Industry.” (May 2013) 62 pp.

Royal Bank of Canada (RBC), Economics & Research, Provincial Outlook (September 2013), 5 pp.

Schulman, Joseph F., “Heavy Truck Weight and Dimension Limits in Canada.” Report for the Railway Association of Canada (2003), 32 pp.

Statistics Canada, “Number of vehicles travelling between Canada and the United States – CANSIM Table 427-0002” [online data]. Ottawa, ON: Statistics Canada. http://www5.statcan.gc.ca/cansim/pick-choisir?lang=eng&p2=33&id=4270002 (last accessed December 2 2013)

Statistics Canada, CANSIM Socio-Economic Database, http://www5.statcan.gc.ca/cansim/home-accueil?lang=eng (last accessed November 13, 2013)

Stephens, Jerry, Jim Scoles, Steve Patterson and Paul Schillings, “Impacts of Adopting Canadian Interprovincial and Canamex Limits on Vehicle Size and Weight on the Montana State Highway System.” Prepared for the Montana Department of Transportation. Department of Civil Engineering, Montana State University, Bozeman, Montana (October 1996), 207 pp.

Swanson, Larry, “Future Job Growth in Montana: Aligning Education and Workforce Development with Expected Future Job Growth.” O’Connor Center for the Rocky Mountain West, the University of Montana, report to the Montana State AFL-CIO, with funding by the U.S. Department of Labor (2012) 52 pp.

TD Economics, “Estimating Longer-Term Growth Prospects in Canada’s Provincial Economies.” Special Report (February 9, 2012) 8 pp.

TD Economics, 2013a, “Gradual Firming Trend in Place.” Provincial Economic Forecast (April 4, 2013) 18 pp.

TD Economics, 2013b, “Slimmer East-West Growth Gap on Tap for 2014 – 2015.” Provincial Economic Forecast (October 11, 2013) 17 pp.

The Canada – United States Transportation Border Working Group (TBWG), Border Map, http://www.thetbwg.org/map_e.htm (last accessed October 29, 2013)

Transportation Research Board of the National Academies (TRB), “Highway Capacity Manual,” Third Edition, (2000) 1,134 pp.

University of California, San Diego (UCSD), “Best Time to Cross the Border,” http://traffic.calit2.net/border/border-crossing-wait-times-map.php (last accessed October 3, 2014)

U. S. Department of Transportation, “The U.S. Department of Transportation’s Western Uniformity Scenario Analysis, A Regional Truck Size and Weight Scenario Requested by the Western Governors’ Association.” (April 2004), 152 pp.

U.S. Bureau of Economic Analysis, U.S. Department of Commerce, National Economic Accounts, http://www.bea.gov/national/Index.htm (last accessed April 21, 2014)

U.S. Bureau of Economic Analysis, U.S. Department of Commerce, Regional Data http://www.bea.gov/iTable/index_regional.cfm (last accessed November 12, 2013)

U.S. Bureau of Labor Statistics, U.S. Department of Labor, Various Databases, http://www.bls.gov/data/ (last accessed November 12, 2013)

U.S. Bureau of Transportation Statistics (BTS), Research and Innovative Technology Administration, U.S. Department of Transportation, Border Crossing / Entry Data, based on data from the Department of Homeland Security, U.S. Customs and Border Protection, Office of Field Operations, http://transborder.bts.gov/programs/international/transborder/TBDR_BC/TBDR_BCQ.html (last accessed November 12, 2013)

U.S. Census Bureau, State & County QuickFacts, http://quickfacts.census.gov/qfd/index.html# (last accessed September 30, 2014)

U.S. Customs and Border Protection (CBP), “Permit Port Questions and Answers.” Area Port of Great Falls MT Information Notice, Bulletin Number 2011-002 (November 9, 2010), 2 pp.

U.S. Customs and Border Protection (CBP), “Port of Wild Horse Commercial Vehicle Survey.” Conducted April 7 through May 31, 2011. Survey results received from Mr. Ross Lyle, Assistant Area Port Director, Trade, Great Falls, Montana

U.S. Customs and Border Protection (CBP), 2013a. "Locate a Port Of Entry - Air, Land, or Sea." [online port information], http://www.cbp.gov/xp/cgov/toolbox/contacts/ports/mt/ (last accessed January 13, 2014)

U.S. Customs and Border Protection (CBP), 2013b. "Port of Sweet Grass Commercial Driver Survey." Conducted June 25 and 27, and July 3 and 4, 2013. Survey results received from Mr. Ross Lyle, Assistant Area Port Director, Trade, Great Falls, Montana

U.S. Department of Agriculture, National Agricultural Statistics Service, Montana Statistics, http://www.nass.usda.gov/Statistics_by_State/Montana/ (last accessed October 27, 2013)

U.S. Department of Transportation, "Western U.S. – Canada Crossborder Case Study. Comprehensive Truck Size and Weight Study." Report No.5, Washington D.C. (December 1995), 11 pp.

U.S. Department of Transportation, Federal Highway Administration (FHWA), Freight Analysis Framework (FAF) Data Tabulation Tool [online database], http://faf.ornl.gov/fafweb/Extraction0.aspx (last accessed January 8, 2014)

U.S. Department of Transportation, Federal Highway Administration (FHWA), Freight Analysis Framework 3 User Guide. (June 2012), 30 pp.

U.S. Department of Transportation, Federal Highway Administration (FHWA), 2009 National Household Travel Survey [tabulation created on the NHTS website], http://nhts.ornl.gov (last accessed December 3, 2013)

U.S. Department of Transportation, Federal Highway Administration (FHWA), "Accounting for Induced Travel in Evaluation of Urban Highway Expansion." (1998), available at http://www.fhwa.dot.gov/steam/doc.htm (last accessed November 12, 2013)

U.S. Department of Transportation, Federal Highway Administration (FHWA), Freight Management and Operations, "Federal Size Regulations for Commercial Motor Vehicles." Online Brochure (2004), available at http://ops.fhwa.dot.gov/freight/publications/size_regs_final_rpt/index.htm (last accessed November 7, 2013)

U.S. Energy Information Administration (EIA), Office of Integrated and International Energy Analysis, Department of Energy, "Annual Energy Outlook 2013 with Projections to 2040." Washington, DC 20585 (April 2013), 233 pp.

Wacziarg, Romain and Karen Horn Welch, "Trade Liberalization and Growth: New Evidence." World Bank Economic Review 22, 2 (June 2008), 44 pp.

Whatcom Council of Governments (WCOG) and Border Policy Research Institute of the Western Washington University, "2013 International Mobility and Trade Corridor Passenger Vehicle Survey." Report of Interim Results, October 2013

WISERTrade and U.S. Census Bureau, Foreign Trade Division, http://www.wisertrade.org (last accessed November 3, 2013)

12 BIBLIOGRAPHY

Boyd, Milton, “Removal of the Canadian Wheat Board Monopoly. Future Changes for Farmers and the Grain Industry.” Frontier Center for Public Policy, Policy Series No. 115, (July 2011), 19 pp.

Fulton, Murray, “The Canadian Wheat Board in an Open Market: The Impact of Removing the Single-Desk Selling Powers.” Adapting to New Environments: Agriculture and Rural Economies in the 21st Century, Knowledge Impact in Society (November 2006), 42 pp.

Government of Alberta, Employment and Immigration, “Alberta Modified Canadian Occupational Projection System (COPS) Outlook, 2011 – 2015, Industry Employment Outlook.” (2011) 3 pp.

Montana Department of Transportation (MDT), “2013-2017 Statewide Transportation Improvement Program” [online PDF document]. Rail, Transit and Planning Division, http://www.mdt.mt.gov/pubinvolve/stip.shtml (accessed December 2013)

Montana Department of Transportation (MDT), “Federal and State Tentative Construction Projects 2013 - 2017” [online PDF map]. Rail, Transit and Planning Division, http://mdt.mt.gov/travinfo/docs/tcp_montana_map.pdf (accessed December 2013)

National Cooperative Highway Research Program, “Directory of Significant Truck Size and Weight Research.” Project 20-07 Task 303, prepared by Jodi L. Carson, Texas Transportation Institute, Texas A&M University System, College Station, Texas (October 2011), 128 pp.

Richmond, Tom, “Montana’s New Energy Frontier: What are the Prospects?” Energy Outlook, Bureau of Business and Economic Research, University of Montana (2012) 3 pp.

Saskatchewan Chamber of Commerce, “Removal of the Canadian Wheat Board’s Single-Desk Selling Powers.” Issue in Focus (September 2011), 10 pp.

TD Economics, “Estimating Longer-Term Growth Prospects in Canada’s Provincial Economies.” Special Report (February 9, 2012) 8 pp.

U.S. Department of Transportation, “Comprehensive Truck Size and Weight Study.” Volume I Summary, Washington D.C. (December 2000), 45 pp.

APPENDIX A: SUMMARY OF FINDINGS FROM INTERVIEWS

This appendix summarizes the findings of a series of telephone interviews with subject matter experts in Northern Montana and in the Provinces of Alberta and Saskatchewan. The findings are organized by sector (Agriculture, Energy, Tourism, Transportation, and Economic Development), topic area (Business & Industry Outlook, Barriers & Opportunities, Border Crossing, etc.) and question. Note that the content of this appendix is based on notes taken during the interviews, and has been only partially edited.

The organizations interviewed within each sector are identified below.

Agriculture

- Montana Grain Growers Association
- Columbia Grain
- Montana Department of Agriculture

Energy

- Fidelity Exploration and Production Company
- Ethanol Producers and Consumers (EPAC)
- Devon Energy / Havre Pipeline Company

Tourism

- Bureau of Land Management
- Fort Peck Dam Interpretive Center and Museum
- Institute for Tourism and Recreation Research – University of Montana
- Charles M. Russell National Wildlife Refuge

Transportation

- Steve Nelson Trucking Inc.
- Great Falls Paper Inc.
- K&K Trucking
- Motor Carriers of Montana

General Economic Development

- North Toole Economic Development
- Teton County Development Corporation
- Regina Regional Economic Development Authority
- Saskatchewan Ministry of Transportation and Infrastructure
- Economic Development Alliance of South East Alberta

A1. Agriculture

A.1.1 Business and Industry Outlook

a. Can you tell me a little bit about trends in your industry over the past 5 to 10 years?

- Growth is all weather-dependent and fluctuates with years of drought. Last year Southern MT was affected by drought, but North was not impacted. Production growth is limited to land size in Montana. Most of the growth in crops is occurring in North Dakota.
- Farming has generally been good in the past five years due to higher prices.
- Seeing more calves-to-cow operations, where they raise the cow for local consumption. Traditionally, MT ranchers sell caves to major markets in Nebraska and Colorado. As a minor trend, local foods are becoming more important in MT (like the rest of the country). Local foods and identification are becoming important for cattle and crops.

b. Based on your existing plans and industry trends, how do you see the growth in your business/industry over the next 5 to 10 years?

- Land in the Conservation Reserve Program (CRP) is coming back online soon and will make more land available for production. USDA paid farmers to set aside highly erodible land for preservation. This reduced the amount of land on the market for farming production. The CRP contracts are ending their lifecycle and farmers are not renewing as farm prices are high and compensation is less than before.
- Not much diversity in crops in MT. Some growth in alternative crops (peas, lentils, oil seeds, canola, chamomile, malt, barely, and other legume crops). Some growth is purely from an agronomic perspective (good for the soil and fields). More businesses that buy these alternative crops are entering MT.
- Future industry growth:

    i. Potential wheat embargo because genetically modified wheat is getting released into the wild. A significant amount of wheat is exported to European and Pacific markets.

    ii. MT wheat has a higher protein weight which gets a premium price. Wheat users for flour (millers, bakers, etc.) require a certain protein level for gluten which is important for bread. Millers can use low quality and mix in the high quality.

    iii. Food safety and food awareness will be important in the future – location and quality of wheat. Containerized shipping will be good for identity preservation of MT wheat for export markets. Containerization will keep from other wheat mixing in at the port.

- Five year growth is likely in soybean and corn production in North Dakota.

- Five year growth is north of the border. Canadian grain will be needed to feed Montana's elevators. Too much capacity in MT grain elevators and margins are shrinking. In 18 months or so, smaller companies may not be able to stay in business.

A.1.2 Border Crossing and Transportation Infrastructure

c. In general, what role does transportation infrastructure and border facilities play in your business and/or industry? (emphasis on trade and cross-border activities, shipping by mode)

- A lot of grain production and small population in Montana, so 90 percent of the crop is for export via rail. Truck transportation only happens from the farm to the grain elevator. Truck is short-haul to rail. Railroad improvements are occurring, but the newer grain elevators are consolidated and are further away from farms increasing some highway travel.

- New elevators are larger "shuttle loading facilities": 110-car unit trains sent directly to the port, with no stopping on the way. Just the way things are going – this is the new standard and it gives better rates because of efficiencies.

- Lots of hay is being imported into the U.S. from Canada headed southern Montana, Wyoming, Colorado, some claim as far south as Texas.

d. What role will transportation/border crossings play in your future plans?

- Sweet Grass, Turner, Raymond are ports that will see a lot of activity. There could be more activity at Wild Horse. 24-hour operations are not necessary, but there is a need for more efficient paperwork and processing. Hours of 6:00 am to 5:00 pm are okay.

- The Sweet Grass POE allows heavier loads (I-15), but respondent does not think trucks will go to the smaller POEs that have gravel roads. Making heavier loads that can travel south from Canada will be an advantage. Heavier loads now are often trans-loaded around the border into two trucks to meet the weight requirements of U.S. roads.

e. Do you expect that investments in border crossings or roadways would improve the operation or growth of your business/industry beyond your existing plans? If so, what do you expect the magnitude of growth to be in your business/industry that will be attributable to improved border crossings?

- Respondent does not foresee major changes in relation to border crossing. More fertilizer will come from North Dakota from natural gas production. This could change the flow of fertilizer at the border (with more exports to Canada).

f. **Specifically, would your business/industry be affected by extended operations (16 hours per day, 7 days a week) at the Wild Horse and Morgan POEs? How?**

- According to one respondent, Wild Horse is a restriction because of limited hours. A lot of fertilizer comes from Canada. Sometimes, trucks have to be diverted to Sweet Grass. More fertilizer production is likely to come from Montana and North Dakota to meet local consumption – from natural gas exploration.

- Ports are not a barrier per se, just cost of transportation which is a function of proximity to local elevators and costs associated with shipping across the border. Uncertain if adjusting hours near the border will impact farming.

A.1.3 Major Changes

g. **Do you foresee any other major changes within the industry which might affect cross-border flows?**

- Potential demand for Canadian grain to feed Montana's elevators.

- New grain elevators are creating hub-and-spoke style infrastructure, leading to larger unit trains with one stop to final destination.

h. **Do you expect that the reform of the Canadian Wheat Board will create significant changes in the wheat industry in Canada? Or impact trade flows and traffic volumes between the U.S. and Canada?**

- Respondent doesn't expect a lot of grain going north (distance and differences in prices will dictate). Farmers haul to nearest elevator.

- Canadian Wheat Board reforms will create a North American market, but ultimately the hauls (O&Ds) will be based on least cost for the farmer to get the grain to an elevator. Currently there is a proposal to require sanitation certifications for U.S. growers exporting to Canada. This would restrict U.S. farmers.

- No major changes have happened after the Canadian Wheat board decisions. Delisting hasn't made a major change, as transportation costs are a more prominent issue for the import/export of wheat. Wheat quality must be verified otherwise wheat is listed as feed quality, which sells at a 50 percent price discount relative to high-protein MT wheat. Elevation pricing is similar on both sides of the border.

- Perception is that there is a "perfect storm" for lowering prices: (a) Canadian Wheat Board allowing wheat to go south – probably not an issue; and (b) new larger elevators.

A.2 Energy

A.2.1 Business and Industry Outlook

a. Can you provide me with a brief overview of your business?

- Respondent's business has limited natural gas operations, mostly oil production. Oil field is mostly drilled out, but has opportunity for more production through artificial lift. Little in/out of Canada for support vehicles.

- BLM Office is involved anytime oil and gas well is tagged for Federal Land. Team shepherds the process and applications - look after production, capping, and abandoning a well (services are from cradle to grave). Also involved in leasing rights.

- EPAC is a national member organization promoting education for ethanol and biodiesel.

b. Can you tell me a little bit about trends in your industry over the past 5 to 10 years?

- Subsidies for ethanol are decreasing, but ethanol blend is required by federal mandate for gasoline as a sustainable component.

- Last couple years haven't been moving or using lots of drilling or closing equipment. Mostly trying to maintain existing fields. Labor force has been same people (no major staffing turnovers) – high retention, natural gas requires very skilled and experienced workers.

c. Based on your existing plans and industry trends, how do you see the growth in your business/industry over the next 5 to 10 years?

- Respondent does not expect major growth in the industry for Montana. Growth may occur in the Bakken region. Gas production is not growing; some have shut down wells as gas prices have gone down. With low prices, growth is anticipated to be the status quo (no proposed growth in the gas fields).

- Biodiesel is mostly for local consumption, but has potential for growth. Local railroad is trying to use biodiesel in locomotives and hopes that it is successful to develop the biodiesel market. Algae into fuel operations are starting up, but are very small and in research phase.

- Until prices are up, respondent does not see much capital investment in natural gas, more money is being invested on the liquid resource side.

A.2.2 Border Crossing and Transportation Infrastructure

d. In general, what role does transportation infrastructure and border facilities play in your business and/or industry? (emphasis on trade and cross-border activities, shipping by mode)

- Operating hours of POE is an issue. There have been cases where trucks are getting stuck at the border because it has closed down. Longer operating hours will provide more flexibility especially for emergency / spur of the moment travel.

- Natural gas always transported by pipeline. Lease oil is shipped by truck to transfer facility or refinery. Mostly shallow natural gas. Most trucked oil is from the Cut Bank field, in the Blackfeet Indian Reservation. Rest of the highline Montana has minimal field development. Most natural gas west of Malta goes north to Canada. Natural gas east of Malta heads east towards North Dakota. Oil is predominantly in the southern part of the state.

- Equipment is mostly, if not all domestic, maybe 10 percent is from Canada. Drilling rigs and hydraulic fracturing crews mostly use Sweet Grass. It is hard to use other crossings because equipment and supplies like explosives are only allowed at certain crossings.

- No ethanol in production in MT. Biodiesel is produced and transported by truck and rail. North Dakota has the most ethanol production. Volume of biodiesel is small, and mostly for local consumption. It is unlikely that any production goes north into Canada.

- Production from Northern MT: very little is transported north to Canada via pipeline. Local pipeline distributes to major and local natural gas hubs. Local hauling is done by ¾ ton pickup trucks to fields.

e. What role will transportation/border crossings play in your future plans?

- Not much border action will increase if gas prices go up, especially near Billings. Oil and gas price have to increase by $8 to $10 (a barrel) to produce more.

f. Do you expect that investments in border crossings or roadways would improve the operation or growth of your business/industry beyond your existing plans? Would your business/industry be affected by extended operations (16 hours per day, 7 days a week) at the Wild Horse and Morgan POEs?

- Operating hours at POE and road conditions have probably no impact on the industry. Hydraulic fracturing crews mostly come from North Dakota. Canadian crews doing work in the U.S. is atypical. Movements are industry-driven, through exploration or major finds, but no big plans now.

- No changes eminent on the horizon that will effect cross-border movements for natural gas. No effect on business by increasing operations at the port. Only local level emphasis for MT residents.

A.3 Tourism

A.3.1 Business and Industry Outlook

a. Can you provide me with a brief overview of your business?

- BLM operates two camp grounds in the area.

- The Fort Peck Dam Interpretive Center and Museum has an average of 30,000 visitors a year: 55-60 percent of visitors are Montana residents, 5 percent international, and the remainder is from the rest of the U.S.. Peak visitation time is summer time – where they get most of their visitors, around 27,000 between Memorial Day and Labor Day.

- The Institute for Tourism and Recreation Research is financed from collections of a 2.5 percent bed tax. All research projects undertaken by the Institute must be approved by the Montana Tourism Advisory Council (a Governor-appointed advisory group).

- Charles M. Russell (CMR) National Wildlife Refuge runs along the Missouri River. It covers 125-130 air miles across North Central and North Eastern Montana, with a total land size of 1.1 million square miles. Public visitation to the refuge is year round (a Congressional mandate). It is a wild life reserve, but it allows hunting and fishing.

- MT fish and wild life parks see a lot of travel in the fall from hunters, less so in the spring.

b. Can you tell me a little bit about trends in your industry over the past 5 to 10 years?

- BLM. Respondent sees growth in hiking, bird watching, and All-Terrain Vehicle (ATV) riding; mostly by locals. Growth in tourism is slow and steady – and there is no reason to think that growth will accelerate.

- Fort Peck Dam Interpretive Center and Museum. The bulk of Canadian visitors is from Saskatchewan, then British Columbia, and followed by Ontario. Gas prices and drought will affect the number of visitor days. Last year there was flooding and it was the first time that the spillway was open in years: this boosted visitation to 52,000 visitors.

- CMR National Wildlife Refuge. Respondent thinks that there are about 250,000 visits per year, but no hard data because there are hundreds of access points, no fees, and no gates. Working with state and counties for road maps – road access is an issue to the reserve, mostly trails. Not much Canadian visitor information. General travel to and from Canada is more difficult than in prior years, probably reducing visitation (due to processing and security).

c. **Based on your existing plans and industry trends, how do you see the growth in your business/industry over the next 5 to 10 years?**

- BLM sees a shift in activities undertaken by tourists. Lower Rockies have a camp that does not have a lot of trails, and does not see as much visitation. Another camp has pedestrian and ATV trails, which has seen growth in visitation by locals and people from out of state.
- Respondent from the CMR National Wildlife Refuge believes that growth will remain slow.
- In general, ATV usage is on the rise, in connection to hunting (for carrying out). It requires a permit. The use of ATVs can be an issue in some forests.

A.3.2 Border Crossing and Transportation Infrastructure

d. **In general, what role does transportation infrastructure and border facilities play in your business and/or industry? (emphasis on trade and cross-border activities, shipping by mode)**

- Fort Peck Dam Interpretive Center and Museum. Since 2009, surveyors are collecting data 20-30 hours a week at airports and service areas. Questions include spending and Origin & Destination. They provide a follow-up mail-in survey. They intercept about 15,000 people a year, and receive 4,000 mail-in surveys. Alberta is #1, and now represents the largest group of visitors. Saskatchewan visitation is growing but is not in the top three. Previously, vacationers from Washington and California were #1. The latest trend is more visitors from Canada. The exchange rate helps. Visitors from Alberta are primarily pass through; some heading to AZ for the summer. Tourists come for shopping, sight seeing, mountains, camping, and for the Flathead Lake. Many surveyed are repeat visitors.

e. **What role will transportation/border crossings play in your future plans?**

- Fort Peck Dam Interpretive Center and Museum. Roadway access and operating hours are important. Opheim is the closest POE. Better information is needed for bi-directional travel. Information that makes it difficult to travel include: border operating hours, seasonal hours, what you can take across and back, or where to exchange money. Would make more trips to Canada if better operating hours and more information. Closest major city is Regina. Have used Scobey POE before because of logistics and timing, but would rather use Opheim due to proximity.

f. **Do you expect that investments in border crossings or roadways would improve the operation or growth of your business/industry beyond your existing plans? How?**

- Improvements to US Highway 191 would help. The U.S. side of 191 is better maintained than the Canadian side

g. Specifically, would your business/industry be affected by extended operations (16 hours per day, 7 days a week) at the Wild Horse and Morgan POEs? How?

- According to one respondent, operating hours at the POEs might not affect visitation because people generally plan around them: people will make the trip no matter what the hours of operation are. But widening US Highway 191 might make a difference.

- Another respondent thought that border operating hours are an important limitation, as travelers sometimes have to leave a day earlier or a day later because of them. People can miss the operating hours.

A.4 Transportation

A.4.1 Business and Industry Outlook

a. Can you provide me with a brief overview of your business?

- Great Falls Paper Inc. Company was started in 1913, now the 3rd generation of family ownership. Had rail service until 1977. Ran trucking company too at one point. Currently provides next-day service to major cities in MT, but does not have own truck fleet. Product comes from Calgary via I-15. Freight goes by carrier line truck (cheapest). Rates now include fuel surcharges. Fuel surcharge was introduced within the last five years; and varies by week.

- One carrier provides mostly long-haul trucking including trips to Canada. Trucks run through Raven, Busby and Bozeman. Most trucks go through Portal, North Dakota – as it offers better operations and is near client.

- Another carrier provides long-haul services with refrigerated trucks all over the U.S., including destinations all the way to Calgary. It crosses the border eight to ten times a week.

- Motor Carriers of Montana. Most traffic heading north, with a lot of produce. Heavy freight heads up I-15. A lot of heavy support equipment headed north for mining (some comes back and heads toward the Bakken Formation or Texas). The Bakken Formation and the oil sands in Canada carry the largest and heaviest loads. A manufacturing plant in Billings sends freight to Calgary.

- Large and heavy freight:

    i. Most heavy freight is on I-15; freight from Billings takes local highways then jumps onto I-15 near Great Falls and heads to Chester.

ii. Large freight has issues with underpasses on I-15. Tall freight from Missoula is diverted onto local highways and then jump onto I-15, 20 to 30 miles from the border.

b. Can you tell me a little bit about trends in your industry over the past 5 to 10 years?

- In the last five years, business has grown by 8 percent annually in terms of freight volume. This is due to less competition (other carriers going out of business during recession) and strategy (more fuel efficient fleet and maintenance cost savings).

c. Based on your existing plans and industry trends, how do you see the growth in your business/industry over the next 5 to 10 years?

- One carrier feels that growth is uncertain, and believes that the company is likely to stay the same size.
- Another carrier believes that government regulations for drivers are hurting business: new requirements for divers' hours will hurt productivity.
- Motor Carriers of Montana. Truck growth is likely to be the same. Growth in the Bakken Formation is steady, but further growth is only possible with favorable prices. Although Bakken growth may be limited by road capacity. So pipeline and intermodal shipments will be important for future growth. Truck growth is expected to be in the neighborhood of 4 to 5 percent a year.

A.4.2 Border Crossing and Transportation Infrastructure

d. In general, what role does transportation infrastructure and border facilities play in your business and/or industry? (emphasis on trade and cross-border activities, shipping by mode)

- A carrier's trucks cross the border at all hours, day and night. They do not use the Wild Horse or Morgan POEs because they are not Electronic Data Interchange (EDI) ports – no electronic transmissions. Increasing operating hours at these POEs will have no impact on their routing decisions. There are no major wait times at the ports they currently use.
- Locally, if using LTL carrier, they hold freight until it makes economic sense to ship. Two-lane roads are adequate for truck traffic in MT. Doubles and Triples are allowed on I-15 and maybe I-90. And there are major intermodal facilities at Butte and Shelby.
- Border issues are usually on the return trip (from Canada into the U.S.), but traffic generally flows well. Electronic portals help move and clear freight easier and ahead of time. The Customs brokers, CBP, shippers, and manufacturers have to be on the same page: about 15 percent of loads experience some problem.

e. What role will transportation/border crossings play in your future plans?

- Mostly used I-15 Sweet Grass because it is a 24-hour port. Bonded private carrier has little weight and comes from Calgary on return trip. Bonded carrier carries California produce to Calgary, and then brings local freight back over the border.

- Airport in Great Falls receives a lot of passengers from Alberta (about 50 percent of total passengers).

f. Do you expect that investments in border crossings or roadways would improve the operation or growth of your business/industry beyond your existing plans? How?

- Smaller POEs don't have the critical mass for longer hours. Respondent uses smaller ports to travel for meetings to Alberta or Saskatchewan in daylight hours. Eastern Saskatchewan has more 24-hour POEs.

- Motor Carriers of Montana. There are intermodal facilities at Shelby and Billings. They are looking to increase local wind generation, and depend on the rail capacity. Recent trend has been the use of large non-stop unit trains, which limits intermodal capacity.

g. Specifically, would your business/industry be affected by extended operations (16 hours per day, 7 days a week) at the Wild Horse and Morgan POEs? How? How much additional volume would you expect to transport approximately through these ports (in percent or number of trucks)?

- More 24-hour ports will allow two extra freight loads a week. Currently, they divert to Sweet Grass instead of the closest port. Primary port is Sweet Grass; the upgrades there 4 to 5 years ago made a big difference. Operating hours can be an issue at smaller ports. Most trucks under 80,000 lbs GVWR do not have issues. Heavy haulers will have issues at, or getting to smaller ports.

- Motor Carriers of Montana. Operating hours: 24 hours is important but: (1) it depends on the time of the year; and (2) the costs of improvements and operation must be compared to the level of traffic (is it cost effective?). The largest POE is Sweet Grass, but there is a lot of freight near Sidney, MT which operates 24 hours a day in the summer. The port north of Havre is not as large, but near the Bakken region. 24 hours in eastern MT would be convenient and would allow for easier planning (less idling, diversion, or waiting for border to reopen).

A.4.3 Major Changes

h. Do you foresee any other major changes within the industry which might affect cross-border flows?

- Loosing labor force of drivers with Commercial Driver's License to Bakken fields. They pay much higher wages. Labor force and population concentrations make the case for development around I-15 infrastructure and other major ports. Grain testing labs are in Great Falls – makes opportunities for trucking.

- Motor Carriers of Montana. Labor force is not keeping up. The hard part for new drivers is not enough examiners. There is a 2-3 week wait now for driving tests; it was 8-12 weeks previously, but MT legislature funded more examiners. Also, not a lot of people want to be drivers. Some regulations/requirements for drivers were waved for veterans, but this is not always helpful as insurance policies may not allow for these requirements to be waved. A lot of divers are going to the Bakken region for higher wages, but now logging companies in MT need drivers. Industry needs experienced drivers. Ten years ago, 1 in 10 jobs in Montana were in trucking, now it is more like 1 in 13.

i. Would the harmonization of truck weight and size regulations (between the United States and Canada) affect the way you are conducting your business? Why or why not?

- Harmonization would not affect one respondent's business as they do not ship with extra axles. All trucks meet U.S. requirements.

- Weight / harmonization would have no impact on their business. If carrier and manufacturer files paperwork correctly –freight moves quickly across the border. This is probably atypical for other companies. An Interstate between Great Falls and Billings would be nice.

- Harmonization is an issue now for another carrier. Canadian hours are more lenient, so it is advantageous to run on Canadian hours. If Canada went to U.S. rules, it would be more of a hindrance to operations and productivity (Canada allows longer driver hours and factors in bad weather conditions).

- Motor Carriers of Montana. No help in Canadian versus U.S. harmonization. Canada uses different truck weight and size restriction formulas. New truck drivers hours: 34 hours will lead companies to hire more drivers. Not hearing too many complaints from companies. Driver hours are similar on both sides.

A.5 General Economic Development

A.5.1 Barriers and Opportunities

a. Can you provide me with a brief overview of recent economic trends in your region?

- Shelby, MT has a new industrial district. Sunburst, MT trucking company to unload and offload near border. Wind farm: Construction of phase 1 is complete; phases 2 and 3 are dependent upon tax credits. Housing costs are up from new border patrol facility, and new higher paid jobs are driving up rents.

- Toole County's five-year growth is in trucking companies. Oil and gas is big and involved in the Bakken region. Toole County has two large fields and new wells. All production is heading south.

- Teton County's major industries are agriculture, government (USDA, forest services), health care, and tourism.

- Saskatchewan's economy closest to the western border is mostly oil and gas, ranching, and grain farming. These are the least populated parts of southern Saskatchewan. Shaunavon, Saskatchewan is a trade hub area for oil and pump jacks. Eastend, Saskatchewan has the T-Rex Discovery Center and right along the border is the Grasslands National Park. The national park is more of a wild life preserve with little development.

- Alberta and Saskatchewan are leading Canada's economy in terms of growth, job creation in the energy sector, and energy investment. Additionally, there is industry growth in Alberta from renewable energy, energy distribution, and transportation companies (near Medicine Hat, Alberta), which can easily travel North-South and East-West.

b. What do you think are the best opportunities for economic growth in your region? Which industries do you think will grow the fastest?

- Trans-loading facility in Sunburst, MT.

- Teton County has slow steady growth, does not expect much growth in the following five years, likely business as usual.

- Alberta. Supply chain growth in the energy sector: cement, drilling, and logistics. Growth projects are diverse including value-added farm production and bio-energy production from U.S. grain and feed stock. There currently is not enough Canadian domestic feedstock for bio-fuel production.

- Regina, Saskatchewan.

    i. Energy: A lot of natural gas and mineral exploration (worth about $5 to 6 billion a year). Foreign investment is growing in extraction.

    ii. Transportation: Better transportation services to the U.S. in western Saskatchewan and eastern Alberta.

    iii. Agriculture: Wheat delisting (Canadian Wheat Board) has increased some trade, but distance is an issue (low product cost and more shipping reduces margins). Fruits and vegetables are shipped to Canada from California, Texas, Florida and Mexico by truck (most of which return to the U.S. empty, but they are trying to fill them up with freight from the Pacific Rim).

c. Are there significant economic development initiatives (specific plans or projects) in your region that we should be aware of as we prepare industry outlooks?

- North Toole. New trucking warehouse 2,500 – 3,000 SF Carolina Industries. Fleet of 100 trucks – not sure how many will be local. POEs need truck stops closer to the border. Shelby and Conrad are the most northern stops.

- Teton County. Major economic development project has stalled – involved moving large modular structures from South Korea to Montana. Provided some infrastructure improvements, but then realized that the costs of transportation were too high and the travel was difficult (modular structures were too big for many roads). Smaller companies are now moving smaller modules, but the scale of proposed operations decreased significantly.

d. What do you think are the main barriers to economic growth in your region?

- Alberta. Class I drivers will be an issue and respondent thinks that there will be a shortage. Raising awareness and marketing. Alberta is an issue, as people forget about the Province and often decisions to not locate in Alberta are not based on economics. The Province has low costs and low taxes. The labor force sees a lot of intra-Provincial migration, but will have trouble finding skilled labor for the energy sector.

- Regina, Saskatchewan. Natural gas prices being down, there could be a 20-year slump, due to more efficient extraction methods, more exploration, etc. Potential development could be smaller, with pocket refineries along natural gas pipelines that can turn natural gas into diesel or gasoline. But one restriction is that the process needs a lot of water.

- Saskatchewan. Shippers want higher weights. Weight harmonization holds the most promise, but it is a difficult federal issue for the U.S. and Canada. Weights and dimension agreement would make road investments easier on both sides of the border.

A.5.2 Border Crossing and Transportation

e. Do you think that border crossings and roadway conditions in Northern Montana have been an issue in recent years? Why or why not?

- Alberta. Sweet Grass is the number one commercial port. Wild Horse and Morgan POEs are too far away. Lethbridge and Calgary are destinations – people prefer I-15 since it's the major highway.

- I-15 to Canada supports some cattle sales from locals. This larger port is ideal for cattle – easier travel and POE offers more services.

- Saskatchewan. Many near the smaller borders are TMS Highways which have a thin layer of pavement over earth. Highway 4 to Morgan is an important road going north but it needs improvements for more truck traffic (about 80 km of roadway improvement). Highway 37 will need heavier pavements too (about 10-15 km of roadway improvement). This investment makes more sense as it is cheaper and travels to Tuner POE via Highway 37. Chicken vs. egg issue now: if truck traffic increases at Morgan and Turner then they will invest, but for more truck traffic to materialize, the ports need investment. Volume/need is a priority for investment.

- Alberta. Infrastructure near Wild Horse to Medicine Hat, Alberta is not great for trucking due to road conditions and hours of operations. A Provincial Park is in the middle of Wild Horse. 24 hours at Wild Horse would require significant infrastructure investment. This would give more options and opportunities to rural residents that need the crossing for economic opportunities and convenience.

f. What role do you think transportation and border crossing will play in future development opportunities?

- Saskatchewan. Border is mostly a federal issue (Canada Border Services Agency (CBSA)). North Gate to North Dakota is the busiest crossing. Highway 6 South has a big development near Raymond, a 24-hour port. 24-hour operation is an issue in Saskatchewan. Over the past ten years, some groups have pushed for the extension of hours at Morgan (Highway 191) and Turner (Highway 37), but the ports have similar volumes, so it is difficult to pick. Also, volumes are not large enough to justify the investment and additional operating costs. Respondent believes that about 20 percent of crossings are commercial.

g. Specifically, would extended operations (16 hours per day, 7 days a week) at the Wild Horse and Morgan POEs have an impact on local and regional businesses? On cross-border flows?

- Teton County. Road improvements will help (far from study area ports) as most take I-15 to Canada. Operating hours are only an issue at POEs near parks that overlap the border. Visitors don’t often plan for that when hiking.

- Alberta. Tourists are likely to stay longer with 24-hour POE operations near national parks (Glacier) and Beauvais Lake Provincial Park. During summer months, more people might use Wild Horse if 24 hours (winter roads are bad). Infrastructure improvements are needed to see full economic benefits of going to 24 hours. It is a “package deal.” For many years, there have been efforts to make Wild Horse 24 hours, there is only one 24-hour port now operating in Alberta.

APPENDIX B: INVENTORY OF MAJOR PROJECTS AND SELECTED MAJOR PROJECTS IN ALBERTA AND SASKATCHEWAN

This appendix provides additional information on major projects (with a value greater than C$2 million) in Alberta and Saskatchewan.

Table B.1: Inventory of Major Projects in Alberta

Sector	Number of Projects	Total Value in Millions of CAN $	Average Project Value
Oil Sands	65	$111,855	$1,720.8
Pipelines	48	$23,552	$490.7
Infrastructure	225	$11,844	$52.6
Oil and Gas	17	$10,690	$628.8
Commercial / Retail	92	$9,109	$99.0
Power	24	$8,903	$371.0
Institutional	114	$6,647	$58.3
Tourism / Recreation	93	$3,918	$42.1
Commercial / Retail and Residential	5	$2,847	$569.3
Residential	120	$2,733	$22.8
Chemicals and Petrochemicals	3	$1,580	$526.7
Mining	2	$470	$235.0
Biofuels	5	$398	$79.6
Agriculture and Related	7	$305	$43.6
Telecommunications	2	$228	$114.0
Other Industrial	8	$163	$20.4
Forestry and Related	3	$105	$35.0
Manufacturing	1	$8	$7.5
Total	**834**	**$195,355**	**$234.2**

Source: Alberta Enterprise and Advanced Education (2013)

Table B.2: Inventory of Major Projects in Saskatchewan

Sector	Number of Projects	Total Value in Millions of CAN $	Average Project Value
Mining	15	$32,583	$2,172.2
Oil / Gas and Pipeline	20	$5,169	$258.4
Industrial/Manufacturing	6	$3,203	$533.8
Infrastructure	76	$2,588	$34.0
Commercial / Retail	78	$2,210	$28.3
Power	85	$2,192	$25.8
Residential	37	$1,743	$47.1
Institutional: Education	64	$996	$15.6
Recreation and Tourism	19	$758	$39.9
Institutional: Non-Health/Education	48	$737	$15.3
Institutional: Health	23	$611	$26.6
Agriculture	7	$342	$48.9
Telecommunications	7	$216	$30.8
Total	**485**	**$53,345**	**$110.0**

Source: Government of Saskatchewan (2013)

Table B.3: Ten Largest Projects in the Oil & Gas Extraction Sector in Alberta

Project	Sub-Sector	Municipality	Value in $Millions	Status	Schedule
'Frontier' Oil Sands Mine Phases 1 and 2	Oil Sands	Regional Municipality of Wood Buffalo	$14,500	Proposed	
'Fort Hills' Oil Sands Mine	Oil Sands	Regional Municipality of Wood Buffalo	$9,600	Proposed	
'Kearl Lake' Oil Sands Project Phase 2 of 2	Oil Sands	Regional Municipality of Wood Buffalo	$8,900	Under Construction	2011-2014
Joslyn North Mine	Oil Sands	Regional Municipality of Wood Buffalo	$8,900	Proposed	2013-2017
Natural Gas to Liquid Fuel Plant (Refinery)	Oil & Gas	Strathcona County	$8,000	On Hold	
North West Bitumen Upgrader Phase 1	Oil Sands	Redwater	$5,700	Under Construction	2013-2016
Trans Mountain Pipeline Expansion	Pipelines	Strathcona County	$5,400	Proposed	2016-2017
'Voyageur South' Oil Sands Mining Operation	Oil Sands	Regional Municipality of Wood Buffalo	$4,400	Proposed	
'Pike' Oil Sands Project	Oil Sands	Lac La Biche County	$3,800	Proposed	
Two New Mine Trains, Mildred Lake Mine Site	Oil Sands	Regional Municipality of Wood Buffalo	$3,600	Under Construction	2012-2014

Source: Alberta Enterprise and Advanced Education (2013)

Table B.4: Ten Largest Projects in the Mining Sector in Saskatchewan

Project	Sub-Sector	Location	Value in $Millions	Status	Schedule
New Greenfield Potash Mine	Mining	Jansen Lake	$10,000	Planning & Design; Tender & Construction	2011-2022
New Potash Mine	Mining	Milestone	$3,300	Proposed	2014-2017
New Potash Mine	Mining	Bethune	$3,250	Planning & Design; Tender & Construction	2011-2023
Potash Mine Expansion	Mining	Rocanville	$2,800	Tender & Construction	2007-2014
Uranium Mine Development	Mining	Cigar Lake	$2,600	Tender & Construction	2005-2013
Potash Mine Expansion	Mining	Belle Plaine	$2,300	Planning & Design; Tender & Construction	2013-2020
New Potash Mine	Mining	Wynyard	$2,000	Proposed	2014-2016
Potash Mine Expansion	Mining	Esterhazy	$1,700	Tender & Construction	2009-2017
Potash Mine Expansion	Mining	Vanscoy	$1,500	Tender & Construction	2009-2014
New Uranium Mine	Mining	Millennium	$860	Proposed	2015-2018

Source: Government of Saskatchewan (2013)

Table B.5: Ten Largest Projects in the Oil & Gas Extraction Sector in Saskatchewan

Project	Sub-Sector	Location	Value in $Millions	Status	Schedule
Oil/Gas Well Drilling	Oil & Gas	Estevan Area	$1,924	Tender & Construction	2013
Oil/Gas Well Drilling	Oil & Gas	Kindersley Area	$1,019	Tender & Construction	2013
Keystone XL Oil Pipeline Project	Pipelines	Hardisty, AB to Gulf Coast in TX	$800	Tender & Construction	2010-2013
Oil/Gas Well Drilling	Oil & Gas	Lloydminster Area	$553	Tender & Construction	2013
Oil/Gas Well Drilling	Oil & Gas	Swift Current Area	$299	Tender & Construction	2013
Vantage Pipeline Project	Pipelines	Tioga, North Dakota to Empress, Alberta	$250	Proposed	2011-2013
Enbridge Bakken Pipeline Project	Pipelines	North Dakota to Steelman and to Cromer	$180	Planning & Design	2011-2013
Transmission Pipelines - new, reroutes and upgrades	Pipelines	Moose Jaw Area	$50	Tender & Construction	2013
Aquistore Project	Oil & Gas	Estevan	$25	Tender & Construction	2012-2013
2013 Integrity Program	Oil & Gas	Saskatchewan misc.	$17	Planning & Design and Tender & Construction	2013

Source: Government of Saskatchewan (2013)

Table B.6: Ten Largest Infrastructure Projects in Alberta

Project	Sub-Sector	Municipality	Value in $Millions	Status	Schedule
Anthony Henday Drive NE Divided Roadway	Infrastructure	Edmonton	$1,810	Under Construction	2012-2016
Light Rail Transit Valley Line Mill Woods/Downtown /Lewis Farms	Infrastructure	Edmonton	$1,800	Proposed	2017-2021
International Transborder Concourse	Infrastructure	Calgary	$1,427	Under Construction	2011-2015
Metro Line Light Rail Transit (Downtown to NAIT)	Infrastructure	Edmonton	$755	Nearing Completion	2011-2013
North - South Parallel Runway	Infrastructure	Calgary	$620	Under Construction	2011-2014
Airport Trail Tunnel Under New Runway	Infrastructure	Calgary	$295	Under Construction	2011-2014
Fort McMurray Airport Upgrade / Expansion	Infrastructure	Regional Municipality of Wood Buffalo	$198	Under Construction	2011-2014
Federal Building Redevelopment	Infrastructure	Edmonton	$165	Under Construction	2008-2014
Highway 63 Grade, Base and Pave plus Bridges 79561	Infrastructure	Athabasca County	$148	Announced	2013-2015
Interchange Highway 2 / 41 Ave	Infrastructure	Edmonton	$146	Announced	2013-2015

Source: Alberta Enterprise and Advanced Education (2013)

Table B.7: All Agriculture Projects in Alberta

Project	Sub-Sector	Municipality	Value in $Millions	Status	Schedule
Fertilizer Plant Expansion	Agriculture & Related	Redwater	$150	Proposed	
Canola Processing Facility	Agriculture & Related	Camrose County	$50	Proposed	2013-2014
Bio refinery	Agriculture & Related	Lacombe	$32	Proposed	2013-2014
New Agrifood Research Centre	Agriculture & Related	Brooks	$29	Proposed	
Canola Processing Facility Expansion	Agriculture & Related	Lethbridge	$20	Proposed	2014-2015
'Harmony Beef' Beef Slaughterhouse Upgrades	Agriculture & Related	Rocky View County	$17	Proposed	
Production Plant	Agriculture & Related	Edmonton	$7	Proposed	

Source: Alberta Enterprise and Advanced Education (2013)

Table B.8: All Agriculture Projects in Saskatchewan

Project	Sub-Sector	Location	Value in $Millions	Status	Schedule
Agriculture and Oil terminal	Agriculture	NorthGate	$90	Planning & Design	2013-2014
Oil Refining Expansion	Agriculture	Clavet	$75	Tender & Construction	2013-2014
Expansion of Canola Crushing Plant	Agriculture	Yorkton	$60	Tender & Construction	2012-2013
New Pasta and Pulse Milling Plant	Agriculture	Regina	$50	Planning & Design	2012-2013
Expansion (Avena Foods)	Agriculture	Regina	$30	Proposed	2014-2015
Expansion of Grain Handling Facility	Agriculture	Estevan	$25	Tender & Construction	2011-2013
New Cattle Feedlot	Agriculture	RM of Rudy	$12	Planning & Design	2010-2013

Source: Government of Saskatchewan (2013)

APPENDIX C: FHWA CROSS-BORDER FREIGHT PROJECTIONS

This appendix summarizes truck traffic projections from FHWA's Freight Analysis Framework, for all ports along the Montana – Canada border.

Table C-1: FHWA Projections of Annual Percent Change in the Volume of Imports into the U.S. from Canada through Montana Ports by Truck, 2015 – 2040

	2015	2020	2025	2030	2035	2040
Alcoholic beverages	3.1%	4.3%	4.3%	3.9%	4.0%	4.1%
Animal feed	4.9%	3.7%	3.6%	3.9%	3.9%	3.9%
Articles-base metal	4.6%	4.3%	4.6%	4.2%	3.9%	3.7%
Base metals	3.4%	3.0%	3.1%	2.9%	2.9%	3.1%
Basic chemicals	4.3%	3.8%	4.7%	4.8%	3.8%	3.7%
Cereal grains	1.8%	1.9%	1.8%	1.7%	1.5%	1.6%
Chemical products	7.0%	5.4%	5.4%	4.8%	3.8%	3.9%
Coal (not elsewhere classified)	3.2%	2.2%	3.9%	3.9%	3.8%	3.6%
Electronics	4.6%	5.2%	5.4%	4.9%	3.3%	3.0%
Fertilizers	0.1%	0.7%	1.5%	1.4%	1.4%	1.4%
Furniture	4.9%	7.7%	8.0%	7.3%	3.5%	3.6%
Live animals / fish	5.0%	2.8%	2.4%	1.9%	1.8%	2.0%
Machinery	6.2%	5.6%	5.4%	5.0%	4.0%	4.1%
Meat / seafood	1.0%	2.6%	3.0%	2.7%	2.7%	3.0%
Metallic ores	8.6%	0.0%	0.3%	0.1%	0.2%	0.3%
Milled grain products	3.0%	4.5%	4.1%	3.6%	3.4%	3.6%
Misc. mfg. products	4.3%	5.1%	5.5%	4.7%	3.9%	3.4%
Mixed freight	4.5%	2.4%	2.5%	2.3%	2.2%	2.4%
Motorized vehicles	5.4%	2.7%	2.5%	2.3%	2.3%	2.8%
Newsprint/paper	2.6%	1.7%	2.8%	3.1%	3.3%	3.5%
Nonmetal min. products	3.4%	3.6%	4.5%	3.9%	3.9%	4.2%
Nonmetallic minerals	5.5%	6.5%	7.0%	6.6%	5.6%	4.9%
Other agricultural products	2.7%	4.4%	4.7%	4.5%	4.2%	4.3%
Other foodstuffs	1.2%	1.5%	1.8%	1.6%	1.6%	1.9%
Paper articles	4.4%	2.6%	2.5%	2.2%	2.2%	2.3%
Pharmaceuticals	5.8%	7.2%	7.6%	7.0%	3.5%	3.4%
Plastics/rubber	4.8%	4.7%	5.0%	4.5%	3.6%	3.6%
Precision instruments	5.3%	6.1%	6.0%	5.5%	3.3%	3.5%
Printed products	4.4%	3.4%	3.9%	3.2%	3.2%	3.5%
Textiles/leather	3.9%	4.0%	4.5%	3.8%	3.5%	3.7%
Tobacco products	-1.3%	-2.1%	-1.7%	-1.7%	-1.6%	-1.7%
Transport equipment	5.2%	6.0%	6.4%	6.0%	4.1%	4.2%
Wood products	3.1%	2.3%	3.0%	3.0%	3.2%	3.4%
TOTAL	**3.7%**	**2.7%**	**3.1%**	**2.9%**	**2.7%**	**2.9%**

Source: FHWA, Freight Analysis Framework

Table C-2: FHWA Projections of Annual Percent Change in the Volume of Exports from the U.S. to Canada through Montana Ports by Truck, 2015 – 2040

	2015	2020	2025	2030	2035	2040
Alcoholic beverages	4.7%	6.4%	5.3%	4.2%	4.1%	4.4%
Animal feed	2.7%	3.3%	2.5%	1.4%	1.4%	1.7%
Articles-base metal	2.6%	4.9%	3.9%	3.0%	2.9%	3.2%
Base metals	5.9%	6.7%	5.5%	4.3%	4.3%	4.5%
Basic chemicals	3.3%	5.0%	3.9%	3.1%	3.1%	3.4%
Cereal grains	-3.9%	-0.2%	-3.3%	-2.9%	-3.5%	3.2%
Chemical products	4.2%	5.9%	4.8%	3.8%	3.7%	3.6%
Coal (not elsewhere classified)	7.4%	3.8%	3.1%	2.0%	2.3%	3.1%
Electronics	4.2%	7.1%	5.8%	5.0%	4.3%	4.2%
Fertilizers	4.3%	3.2%	2.4%	1.3%	1.3%	1.6%
Furniture	3.0%	8.0%	6.8%	6.3%	3.8%	3.1%
Live animals / fish	4.1%	3.2%	2.3%	1.3%	1.2%	1.6%
Machinery	4.8%	6.8%	5.6%	4.6%	4.4%	4.4%
Meat / seafood	3.7%	4.4%	3.4%	2.4%	2.3%	2.7%
Metallic ores	11.0%	2.9%	3.3%	0.9%	1.5%	2.4%
Milled grain products	4.0%	5.5%	4.4%	3.3%	3.3%	3.7%
Misc. mfg. products	6.9%	7.0%	6.0%	5.1%	5.2%	3.6%
Mixed freight	5.4%	4.8%	3.6%	2.7%	2.6%	2.9%
Motorized vehicles	6.3%	3.3%	2.5%	1.4%	1.4%	1.8%
Newsprint/paper	4.4%	2.1%	1.4%	0.3%	0.2%	0.6%
Nonmetal min. products	6.4%	5.6%	4.6%	3.6%	3.7%	3.7%
Nonmetallic minerals	3.7%	7.9%	6.4%	5.1%	3.2%	4.5%
Other agricultural products	4.6%	6.7%	5.5%	4.5%	4.2%	3.9%
Other foodstuffs	4.2%	4.6%	3.6%	2.5%	2.2%	2.8%
Paper articles	4.4%	5.8%	4.8%	3.9%	3.6%	3.9%
Pharmaceuticals	7.4%	8.6%	7.2%	6.3%	3.4%	3.2%
Plastics/rubber	3.3%	6.2%	5.0%	4.1%	4.1%	4.2%
Precision instruments	5.3%	7.5%	6.3%	5.5%	4.0%	3.9%
Printed products	4.9%	3.7%	2.8%	1.8%	1.7%	2.1%
Textiles/leather	3.9%	4.0%	3.2%	2.3%	1.9%	2.2%
Tobacco products	1.0%	0.1%	-0.6%	-1.7%	-1.7%	-1.3%
Transport equipment	9.1%	9.7%	8.7%	7.5%	3.2%	2.3%
Wood products	7.2%	5.3%	4.2%	3.3%	3.2%	3.7%
TOTAL	**4.5%**	**5.8%**	**4.7%**	**3.8%**	**3.4%**	**3.7%**

Source: FHWA, Freight Analysis Framework

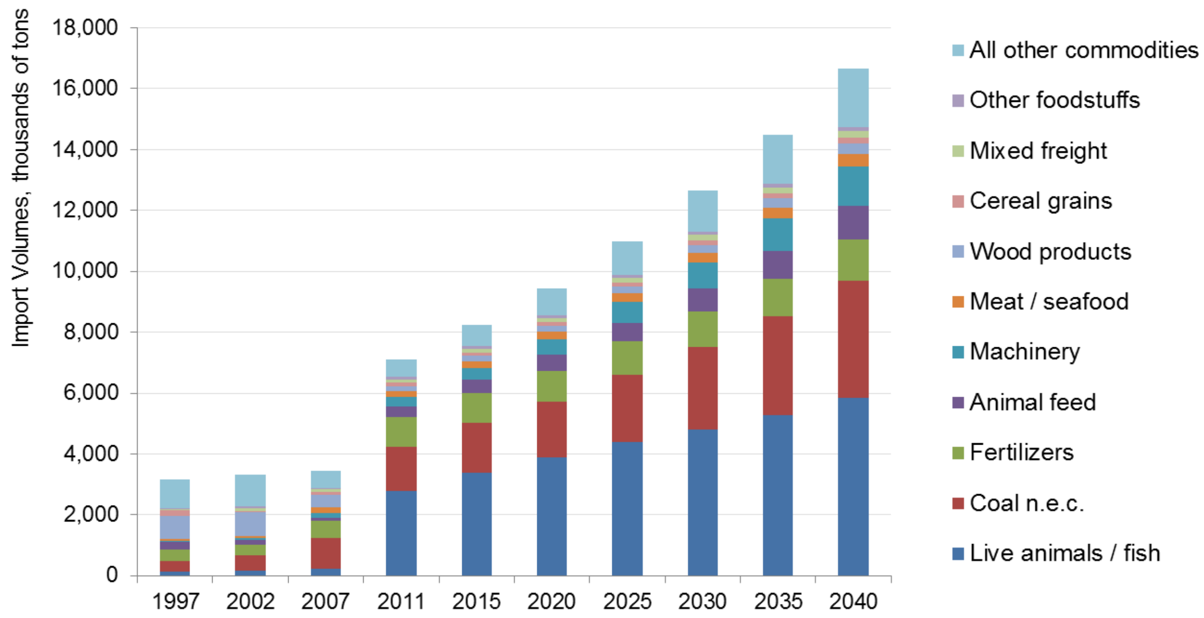

Figure C-1: Imports from Canada through Montana Ports by Truck, by Commodity, 2015 – 2040

Source: FHWA, Freight Analysis Framework

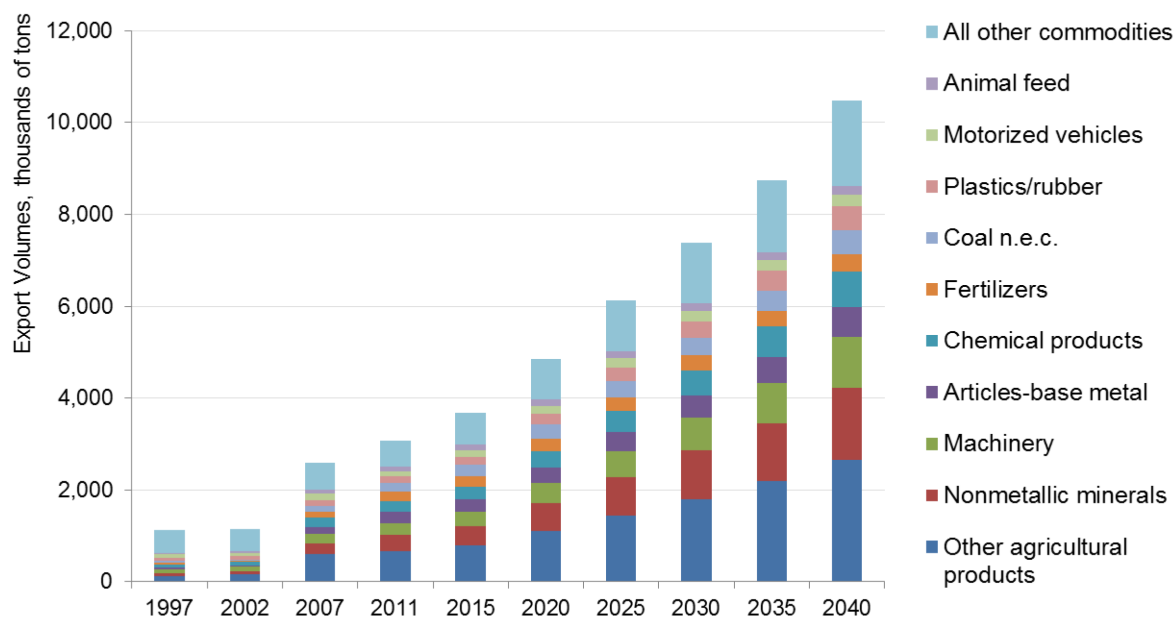

Figure C-2: Exports from Canada through Montana Ports by Truck, by Commodity, 2015 – 2040

Source: FHWA, Freight Analysis Framework

APPENDIX D: SOUTHBOUND BORDER CROSSING DATA

This appendix provides historical data on southbound (incoming) border crossings at the ports of Wild Horse and Morgan, as well as total southbound crossings for the ICED 1 Study Area, Montana and the Northern border.

D.1 Wild Horse

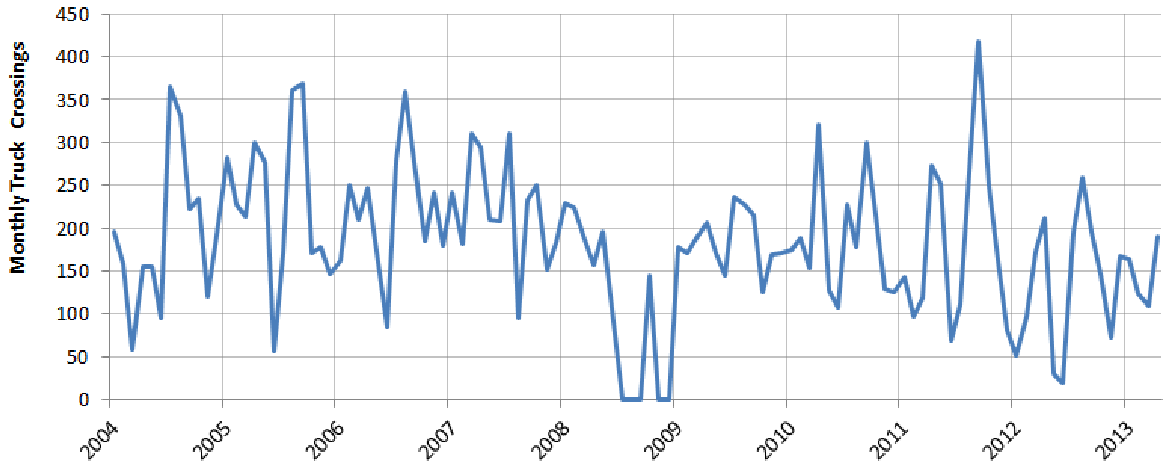

Figure D-1: Monthly Incoming Trucks at the Wild Horse POE, Jan 2004 – Apr 2013

Source: U.S. Bureau of Transportation Statistics, based on data from the Department of Homeland Security, U.S. Customs and Border Protection, Office of Field Operations

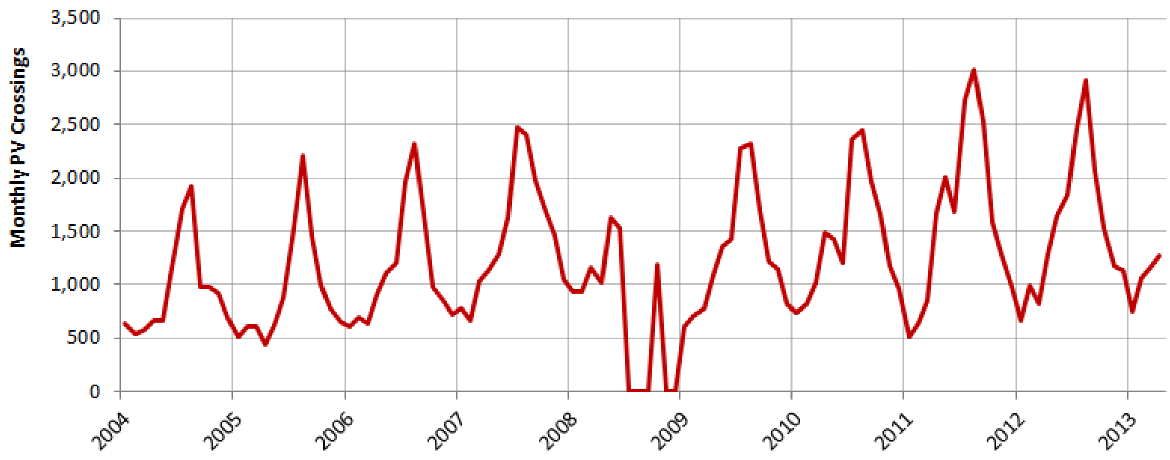

Figure D-2: Monthly Incoming Personal Vehicles at the Wild Horse POE, Jan 2004 – Apr 2013

Source: U.S. Bureau of Transportation Statistics, based on data from the Department of Homeland Security, U.S. Customs and Border Protection, Office of Field Operations

D.2 Morgan

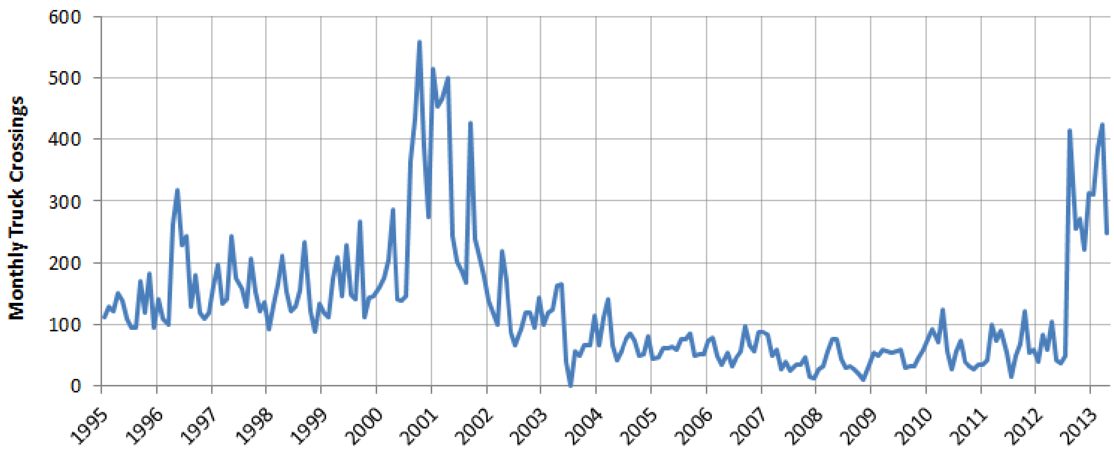

Figure D-3: Monthly Incoming Trucks at the Morgan POE, Jan 1995 – Apr 2013

Source: U.S. Bureau of Transportation Statistics, based on data from the Department of Homeland Security, U.S. Customs and Border Protection, Office of Field Operations

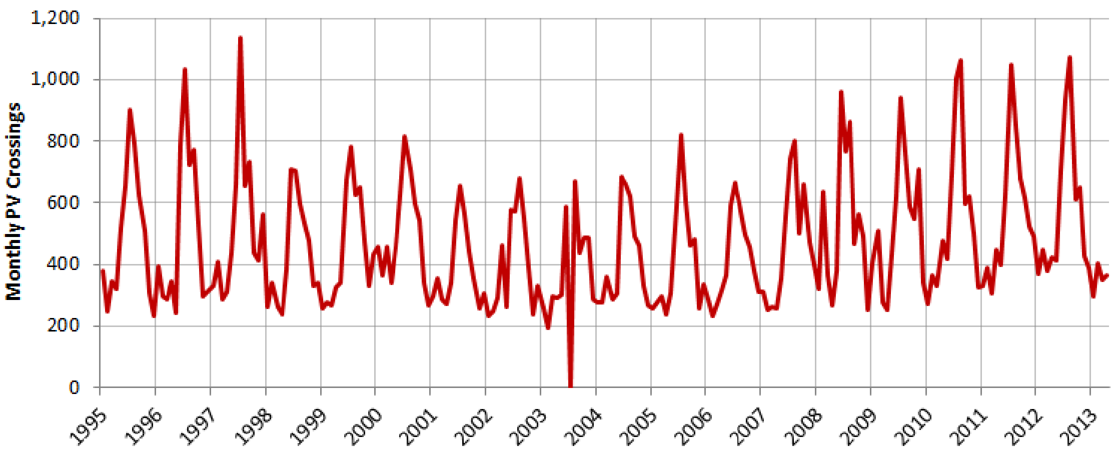

Figure D-4: Monthly Incoming Personal Vehicles at the Morgan POE, Jan 1995 – Apr 2013

Source: U.S. Bureau of Transportation Statistics, based on data from the Department of Homeland Security, U.S. Customs and Border Protection, Office of Field Operations

D.3 All Ports in Montana

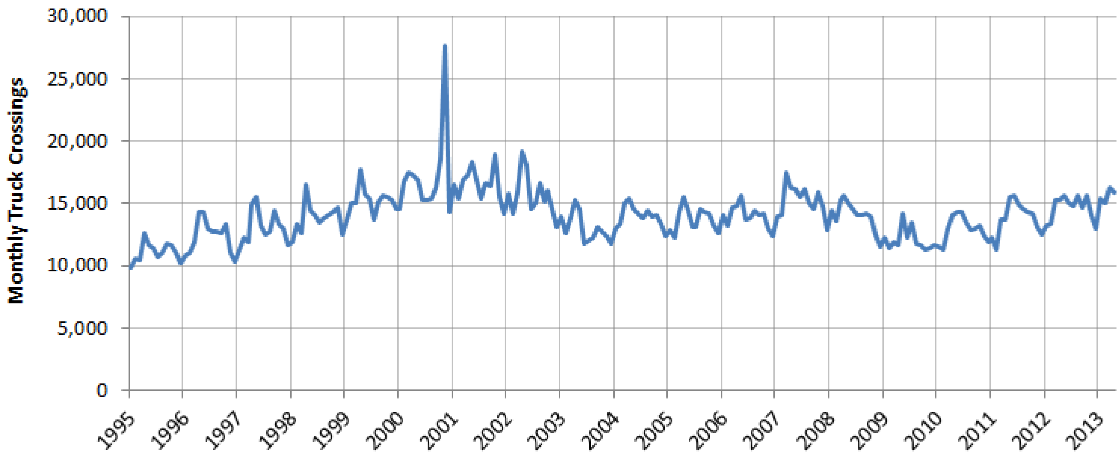

Figure D-5: Monthly Incoming Trucks at all POEs in Montana, Jan 1995 – Apr 2013

Source: U.S. Bureau of Transportation Statistics, based on data from the Department of Homeland Security, U.S. Customs and Border Protection, Office of Field Operations

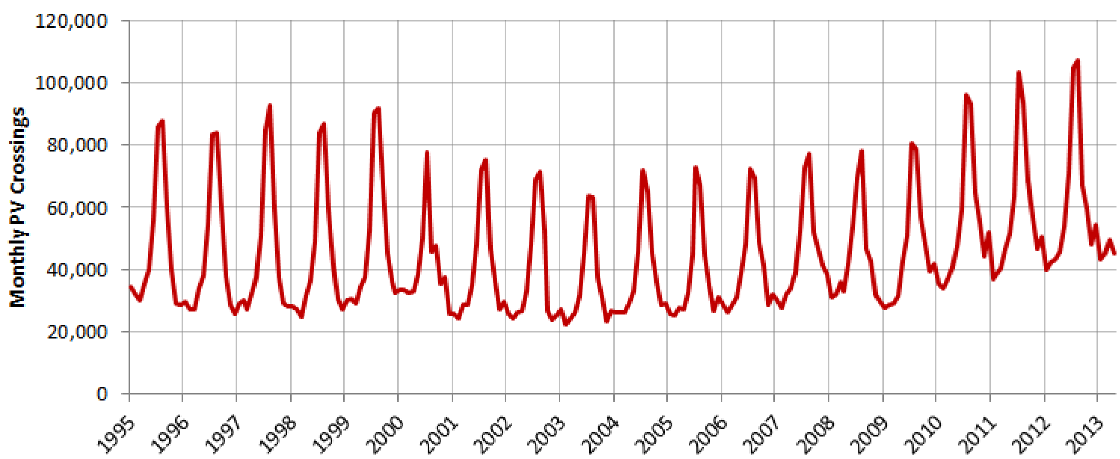

Figure D-6: Monthly Incoming Personal Vehicles at all POEs in Montana, Jan 1995 – Apr 2013

Source: U.S. Bureau of Transportation Statistics, based on data from the Department of Homeland Security, U.S. Customs and Border Protection, Office of Field Operations

D.4 All Ports along the U.S. – Canada Border

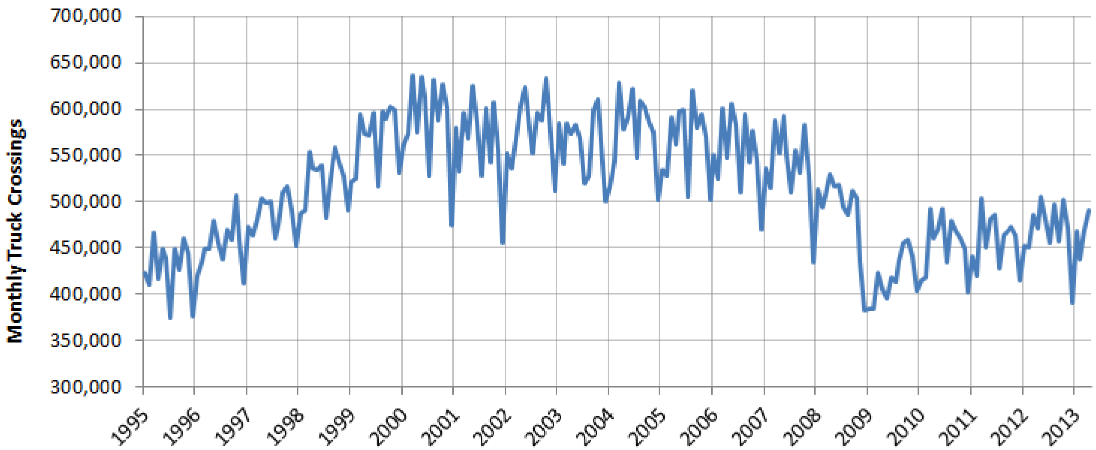

Figure D-7: Monthly Incoming Trucks at all POEs along the Northern Border, Jan 1995 – Apr 2013

Source: U.S. Bureau of Transportation Statistics, based on data from the Department of Homeland Security, U.S. Customs and Border Protection, Office of Field Operations

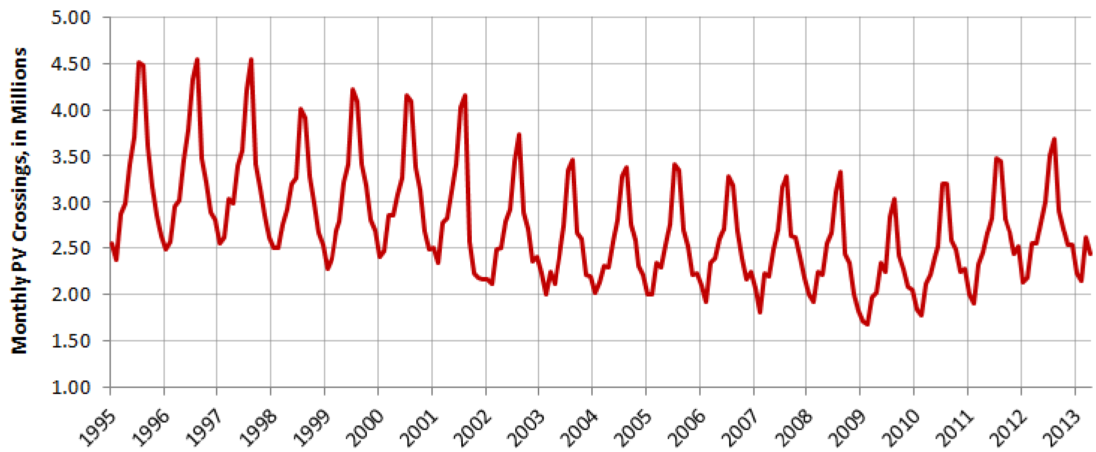

Figure D-8: Monthly Incoming Personal Vehicles at all POEs along the Northern Border, Jan 1995 – Apr 2013

Source: U.S. Bureau of Transportation Statistics, based on data from the Department of Homeland Security, U.S. Customs and Border Protection, Office of Field Operations

D.5 Comparison of CBP and MDT Data

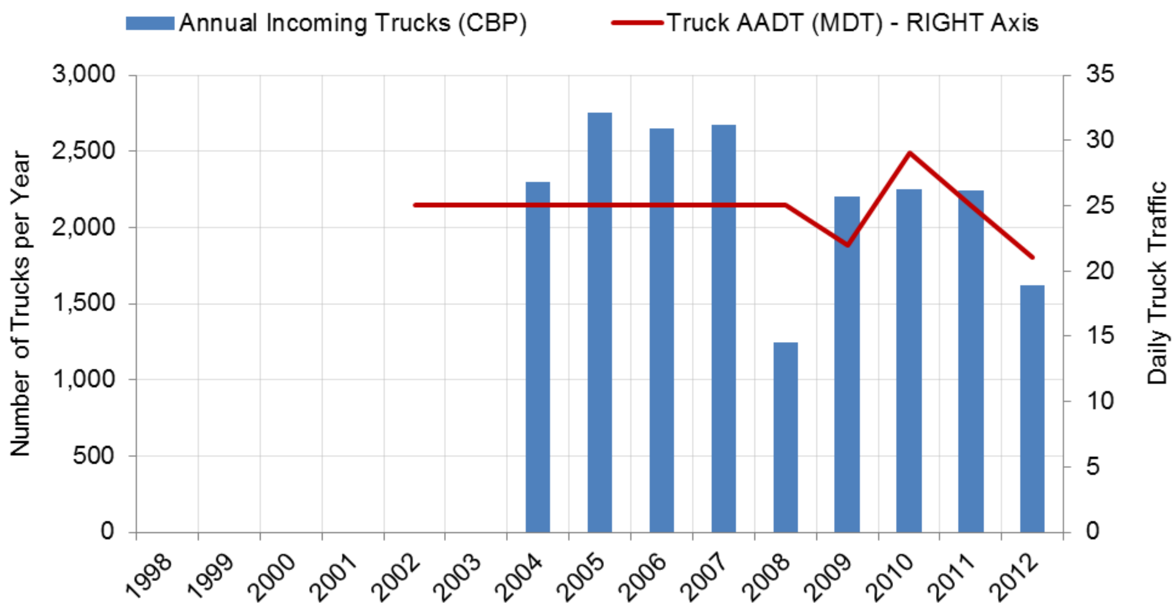

Figure D-9: Incoming Trucks and Truck AADT at Wild Horse POE, 1998 – 2012

Sources: BTS (2013) and MDT (2013a)

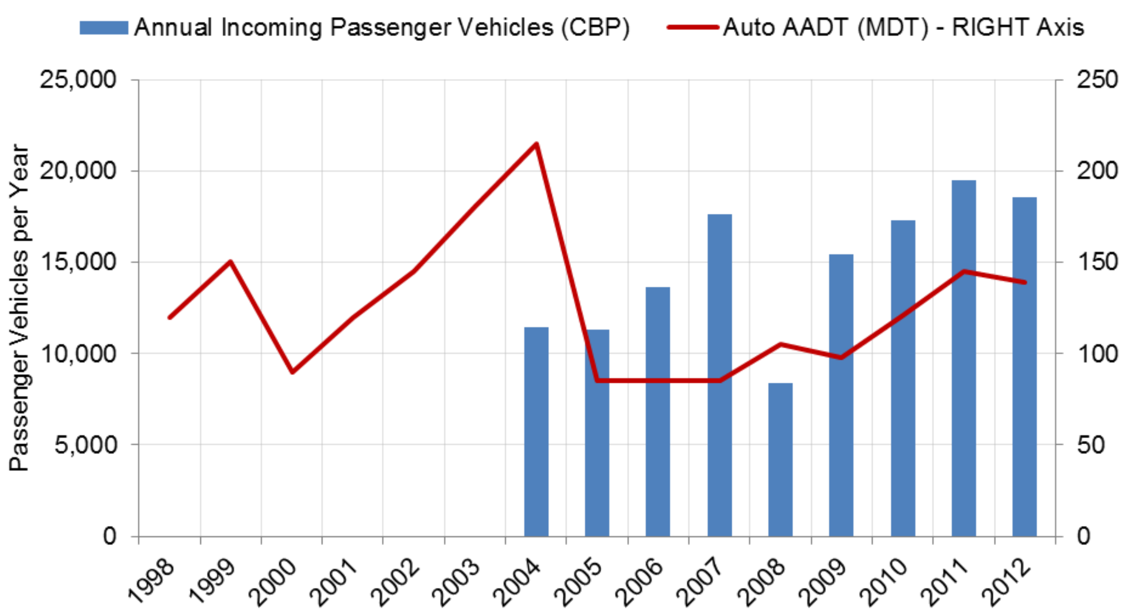

Figure D-10: Incoming Passenger Vehicles and Auto AADT at Wild Horse POE, 1998 – 2012

Sources: BTS (2013) and MDT (2013a)

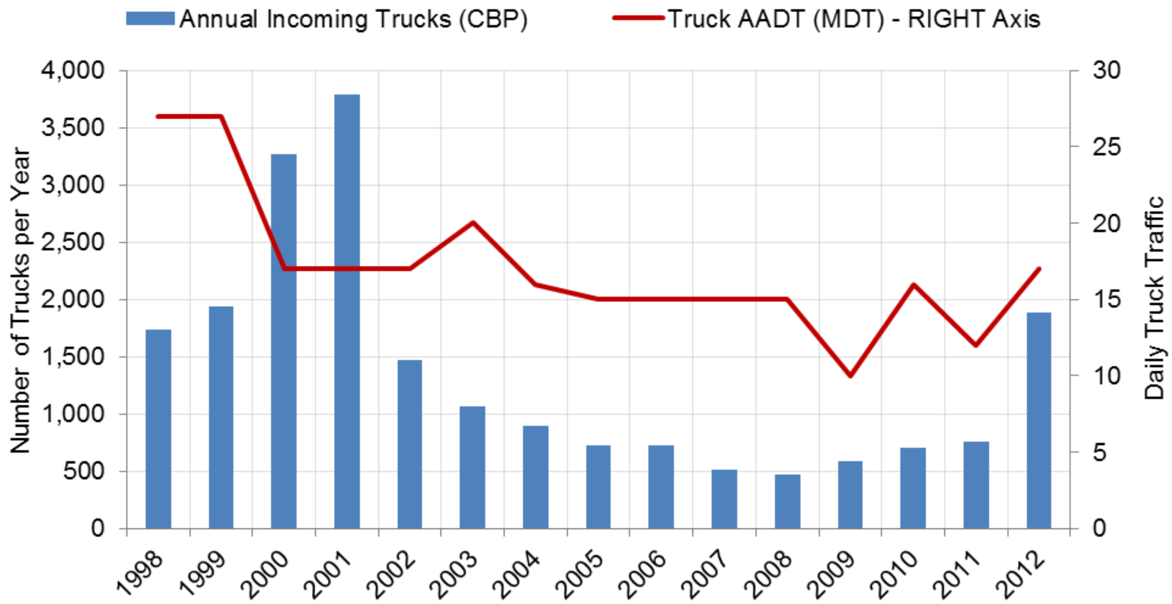

Figure D-11: Incoming Trucks and Truck AADT at Morgan POE, 1998 – 2012

Sources: BTS (2013) and MDT (2013a)

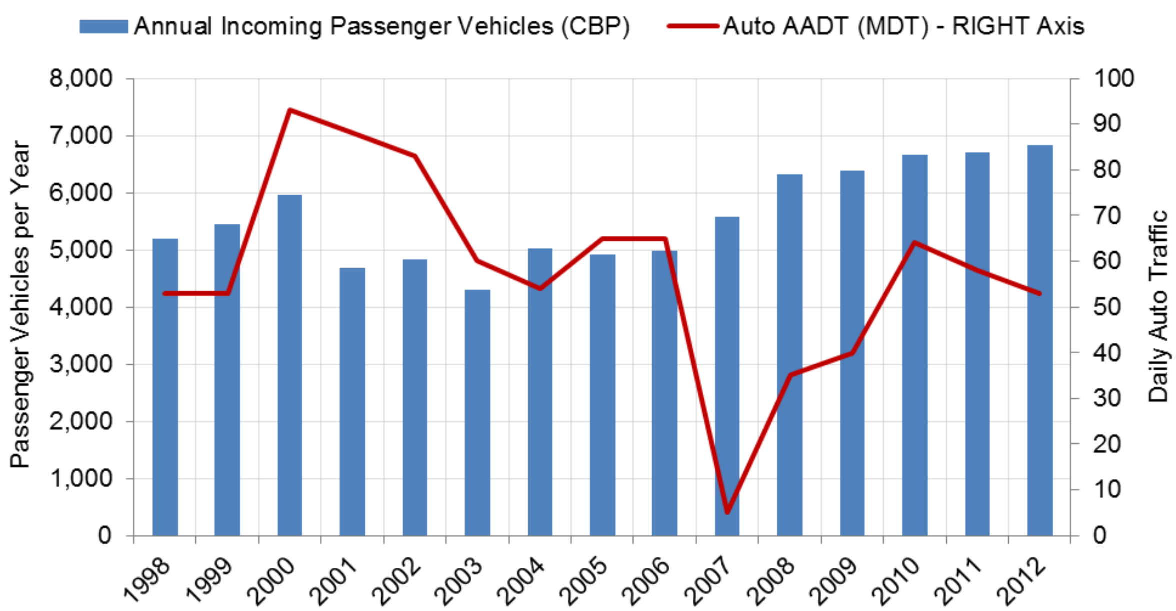

Figure D-12: Incoming Passenger Vehicles and Auto AADT at Morgan POE, 1998 – 2012

Sources: BTS (2013) and MDT (2013a)

Table D-1: Number of Incoming Trucks and Annual Growth in Incoming Trucks by Port, 1998 – 2012

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Wild Horse	N/A	N/A	N/A	N/A	N/A	N/A	2,298	2,750	2,650	2,671	1,244	2,206	2,248	2,242	1,621
Morgan	1,735	1,941	3,270	3,783	1,469	1,062	897	726	727	512	464	584	703	758	1,887
Sweet Grass	120,084	127,468	146,162	140,233	135,879	110,439	114,138	115,835	120,991	137,042	135,999	118,678	124,214	129,150	132,341
Willow Creek	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14	10	12	32	4	1	0	0
Turner	410	333	620	554	285	334	395	281	492	324	302	876	748	915	1,682
Opheim	547	901	2,047	2,556	1,175	679	1,234	745	524	480	321	356	332	390	1,221
Scobey	149	294	579	1,090	997	784	794	862	612	491	89	384	376	527	1,750
Whitetail	78	243	251	264	257	198	120	100	74	85	31	61	45	61	158
Raymond	17,020	17,345	17,907	21,018	17,283	17,094	21,510	20,604	19,230	20,214	15,629	10,863	13,684	16,939	19,244
Study Area	140,023	148,525	170,836	169,498	157,345	130,590	141,386	141,917	145,310	161,831	154,111	134,012	142,351	150,982	159,904
Rest of MT	25,741	34,038	34,741	28,717	30,850	25,674	26,292	22,592	22,922	20,872	14,824	10,899	12,665	14,836	15,866
Total MT	165,764	182,563	205,577	198,215	188,195	156,264	167,678	164,509	168,232	182,703	168,935	144,911	155,016	165,818	175,770
North Border	6,270,934	6,817,447	7,048,128	6,776,909	6,915,973	6,735,737	6,903,882	6,783,944	6,649,249	6,477,761	5,894,551	5,020,633	5,444,405	5,490,375	5,623,507

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Wild Horse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19.7%	-3.6%	0.8%	-53.4%	77.3%	1.9%	-0.3%	-27.7%
Morgan	N/A	11.9%	68.5%	15.7%	-61.2%	-27.7%	-15.5%	-19.1%	0.1%	-29.6%	-9.4%	25.9%	20.4%	7.8%	148.9%
Sweet Grass	N/A	6.1%	14.7%	-4.1%	-3.1%	-18.7%	3.3%	1.5%	4.5%	13.3%	-0.8%	-12.7%	4.7%	4.0%	2.5%
Willow Creek	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-28.6%	20.0%	166.7%	-87.5%	-75.0%	-100.0%	N/A
Turner	N/A	-18.8%	86.2%	-10.6%	-48.6%	17.2%	18.3%	-28.9%	75.1%	-34.1%	-6.8%	190.1%	-14.6%	22.3%	83.8%
Opheim	N/A	64.7%	127.2%	24.9%	-54.0%	-42.2%	81.7%	-39.6%	-29.7%	-8.4%	-33.1%	10.9%	-6.7%	17.5%	213.1%
Scobey	N/A	97.3%	96.9%	88.3%	-8.5%	-21.4%	1.3%	8.6%	-29.0%	-19.8%	-81.9%	331.5%	-2.1%	40.2%	232.1%
Whitetail	N/A	211.5%	3.3%	5.2%	-2.7%	-23.0%	-39.4%	-16.7%	-26.0%	14.9%	-63.5%	96.8%	-26.2%	35.6%	159.0%
Raymond	N/A	1.9%	3.2%	17.4%	-17.8%	-1.1%	25.8%	-4.2%	-6.7%	5.1%	-22.7%	-30.5%	26.0%	23.8%	13.6%
Study Area	N/A	6.1%	15.0%	-0.8%	-7.2%	-17.0%	8.3%	0.4%	2.4%	11.4%	-4.8%	-13.0%	6.2%	6.1%	5.9%
Rest of MT	N/A	32.2%	2.1%	-17.3%	7.4%	-16.8%	2.4%	-14.1%	1.5%	-8.9%	-29.0%	-26.5%	16.2%	17.1%	6.9%
Total MT	N/A	10.1%	12.6%	-3.6%	-5.1%	-17.0%	7.3%	-1.9%	2.3%	8.6%	-7.5%	-14.2%	7.0%	7.0%	6.0%
North Border	N/A	8.7%	3.4%	-3.8%	2.1%	-2.6%	2.5%	-1.7%	-2.0%	-2.6%	-9.0%	-14.8%	8.4%	0.8%	2.4%

Notes: In this table, N/A stands for Not Available
Source: BTS (2013)

Table D-2: Number of Incoming Passenger Vehicles and Annual Growth in Incoming Passenger Vehicles by Port, 1998 – 2012

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Wild Horse	N/A	N/A	N/A	N/A	N/A	N/A	11,472	11,304	13,646	17,597	8,398	15,457	17,285	19,484	18,567
Morgan	5,187	5,438	5,963	4,681	4,836	4,297	5,019	4,921	4,971	5,579	6,327	6,393	6,663	6,712	6,820
Sweet Grass	198,866	213,041	214,331	197,042	196,069	182,626	216,333	215,381	235,667	258,931	241,991	262,615	298,441	289,964	307,398
Willow Creek	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2076	2792	2394	2179	3804	4734	5827	4535
Turner	6,692	6,767	6,182	5,406	5,080	4,160	4,263	4,718	4,700	5,899	6,656	6,529	8,409	8,608	10,492
Opheim	5,004	5,805	4,810	4,914	4,513	3,409	3,631	3,274	3,588	4,015	3,933	3,435	3,576	3,869	5,966
Scobey	4,053	7,348	7,007	6,886	6,790	5,824	5,478	4,986	5,122	5,117	5,034	4,318	5,239	5,741	6,685
Whitetail	5,501	6,153	4,854	4,775	4,998	3,362	1,546	1,197	1,189	1,079	642	1,194	1,145	890	1,036
Raymond	35,491	34,173	29,999	28,611	25,397	22,063	23,138	21,750	22,942	26,094	24,389	21,562	22,744	27,530	26,740
Study Area	260,794	278,725	273,146	252,315	247,683	225,741	270,880	269,607	294,617	326,705	299,549	325,307	368,236	368,625	388,239
Rest of MT	264,965	298,556	216,865	225,511	205,507	197,036	191,357	190,383	198,834	216,976	227,109	230,604	291,122	327,907	349,485
Total MT	525,759	577,281	490,011	477,826	453,190	422,777	462,237	459,990	493,451	543,681	526,658	555,911	659,358	696,532	737,724
North Border	36,596,806	37,219,910	36,915,053	34,308,013	32,538,817	30,245,165	30,660,487	30,351,683	30,038,524	29,775,714	28,686,786	26,706,830	28,884,267	31,595,769	33,083,636

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Wild Horse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-1.5%	20.7%	29.0%	-52.3%	84.1%	11.8%	12.7%	-4.7%
Morgan	N/A	4.8%	9.7%	-21.5%	3.3%	-11.1%	16.8%	-2.0%	1.0%	12.2%	13.4%	1.0%	4.2%	0.7%	1.6%
Sweet Grass	N/A	7.1%	0.6%	-8.1%	-0.5%	-6.9%	18.5%	-0.4%	9.4%	9.9%	-6.5%	8.5%	13.6%	-2.8%	6.0%
Willow Creek	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	34.5%	-14.3%	-9.0%	74.6%	24.4%	23.1%	-22.2%
Turner	N/A	1.1%	-8.6%	-12.6%	-6.0%	-18.1%	2.5%	10.7%	-0.4%	25.5%	12.8%	-1.9%	28.8%	2.4%	21.9%
Opheim	N/A	16.0%	-17.1%	2.2%	-8.2%	-24.5%	6.5%	-9.8%	9.6%	11.9%	-2.0%	-12.7%	4.1%	8.2%	54.2%
Scobey	N/A	81.3%	-4.6%	-1.7%	-1.4%	-14.2%	-5.9%	-9.0%	2.7%	-0.1%	-1.6%	-14.2%	21.3%	9.6%	16.4%
Whitetail	N/A	11.9%	-21.1%	-1.6%	4.7%	-32.7%	-54.0%	-22.6%	-0.7%	-9.3%	-40.5%	86.0%	-4.1%	-22.3%	16.4%
Raymond	N/A	-3.7%	-12.2%	-4.6%	-11.2%	-13.1%	4.9%	-6.0%	5.5%	13.7%	-6.5%	-11.6%	5.5%	21.0%	-2.9%
Study Area	N/A	6.9%	-2.0%	-7.6%	-1.8%	-8.9%	20.0%	-0.5%	9.3%	10.9%	-8.3%	8.6%	13.2%	0.1%	5.3%
Rest of MT	N/A	12.7%	-27.4%	4.0%	-8.9%	-4.1%	-2.9%	-0.5%	4.4%	9.1%	4.7%	1.5%	26.2%	12.6%	6.6%
Total MT	N/A	9.8%	-15.1%	-2.5%	-5.2%	-6.7%	9.3%	-0.5%	7.3%	10.2%	-3.1%	5.6%	18.6%	5.6%	5.9%
North Border	N/A	1.7%	-0.8%	-7.1%	-5.2%	-7.0%	1.4%	-1.0%	-1.0%	-0.9%	-3.7%	-6.9%	8.2%	9.4%	4.7%

Notes: In this table, N/A stands for Not Available
Source: BTS (2013)

APPENDIX E: NORTHBOUND BORDER CROSSING DATA

This appendix provides historical data on northbound border crossings at the ports of Wild Horse and Morgan, as well as total crossings for the ICED 1 Study Area.

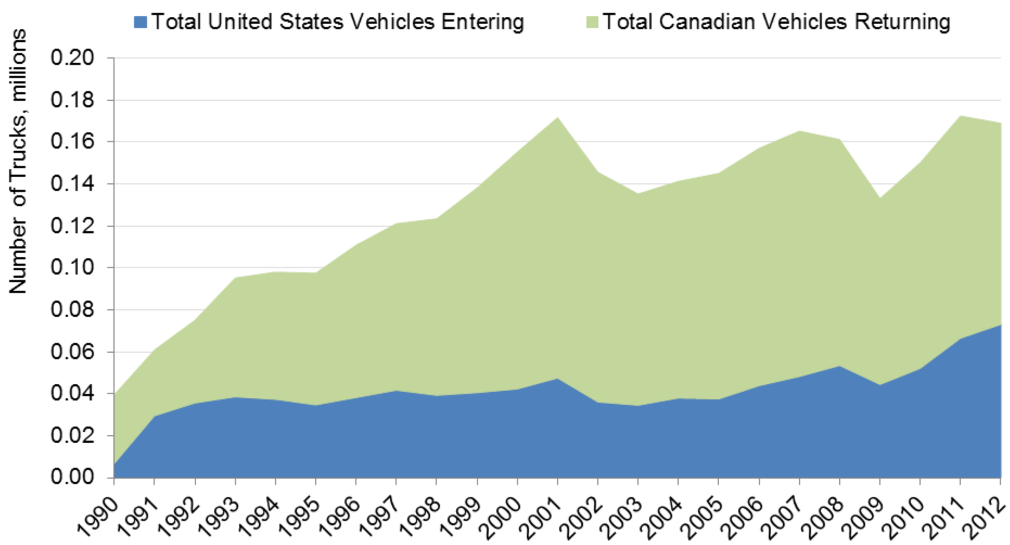

Figure E-1: Northbound Truck Crossings through all Ports in the ICED 1 Study Area, United States vs. Canadian Vehicles, 1990 – 2012

Source: Statistics Canada (Table 427-0002)

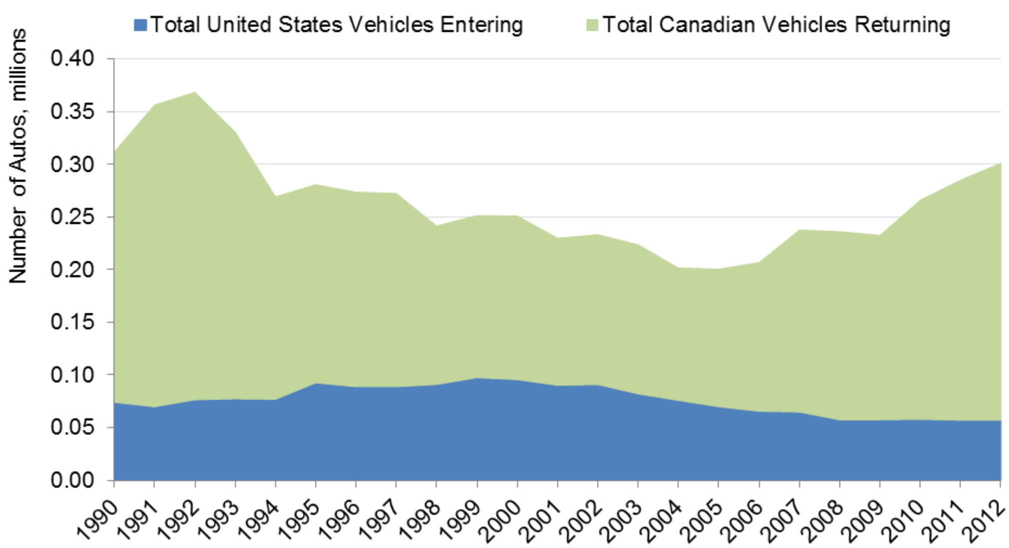

Figure E-2: Northbound Auto Crossings through all Ports in the ICED 1 Study Area, United States vs. Canadian Vehicles, 1990 – 2012

Source: Statistics Canada (Table 427-0002)

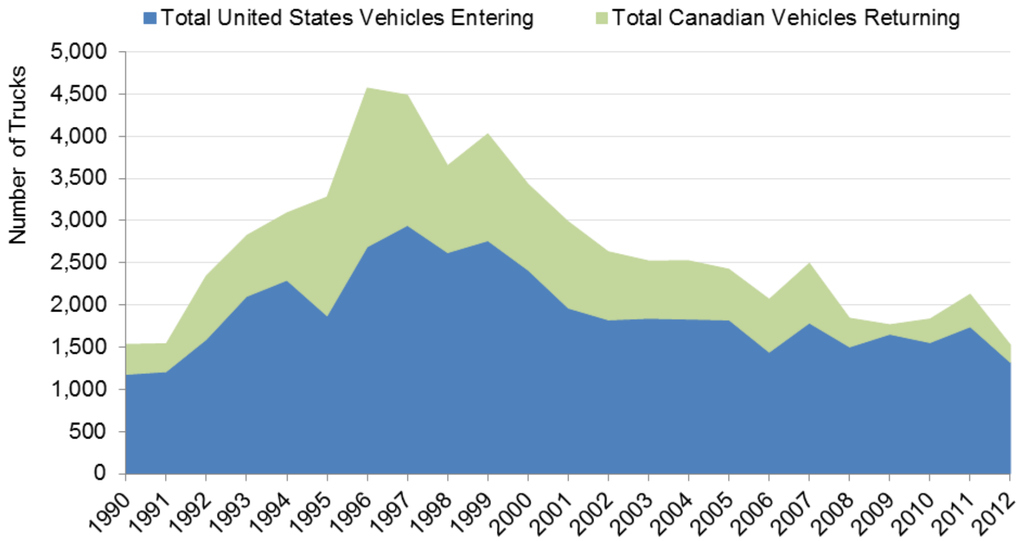

Figure E-3: Northbound Truck Crossings through Wild Horse POE, United States vs. Canadian Vehicles, 1990 – 2012

Source: Statistics Canada (Table 427-0002)

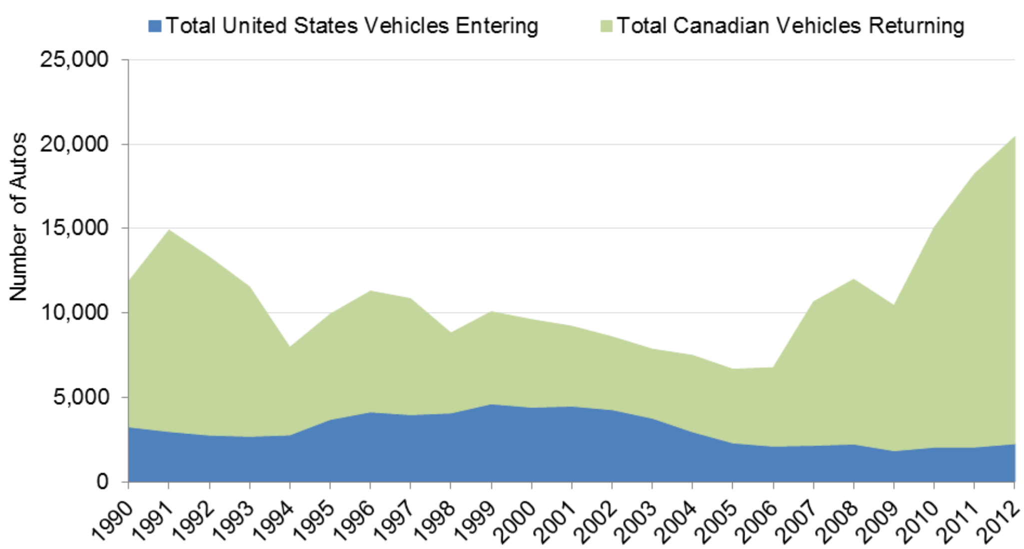

Figure E-4: Northbound Auto Crossings through Wild Horse POE, United States vs. Canadian Vehicles, 1990 – 2012

Source: Statistics Canada (Table 427-0002)

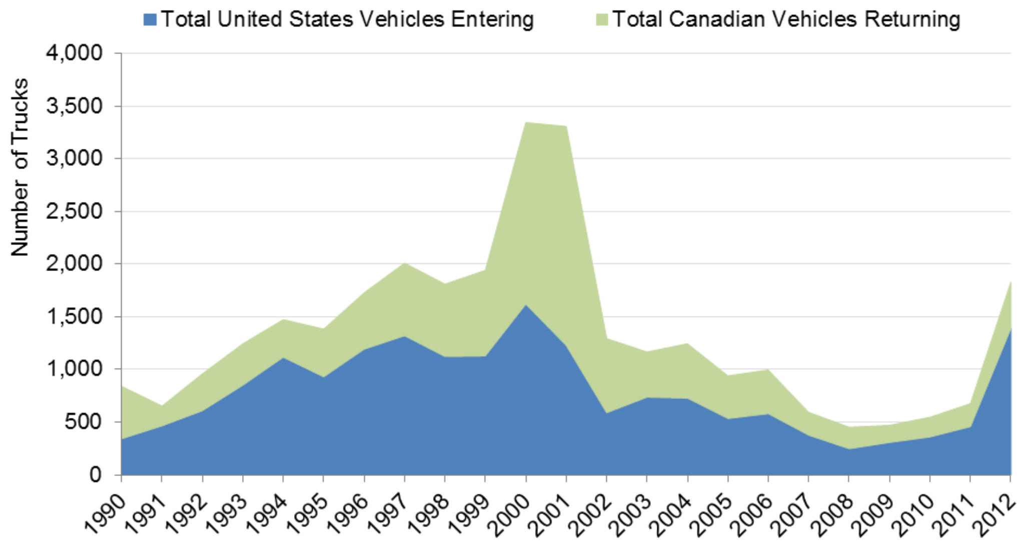

Figure E-5: Northbound Truck Crossings through Morgan / Monchy POE, United States vs. Canadian Vehicles, 1990 – 2012

Source: Statistics Canada (Table 427-0002)

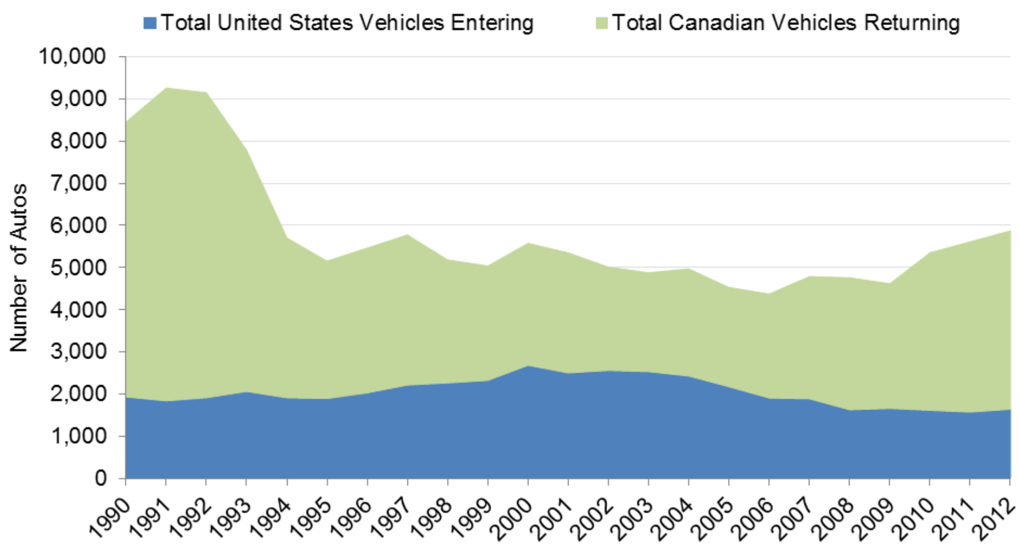

Figure E-6: Northbound Auto Crossings through Morgan / Monchy POE, United States vs. Canadian Vehicles, 1990 – 2012

Source: Statistics Canada (Table 427-0002)

APPENDIX F: SOUTHBOUND BORDER CROSSING WAIT TIME DATA

This appendix summarizes wait time data for southbound passenger vehicles and trucks passing through the POE at Sweet Grass. Similar data are not available at Wild Horse and Morgan.

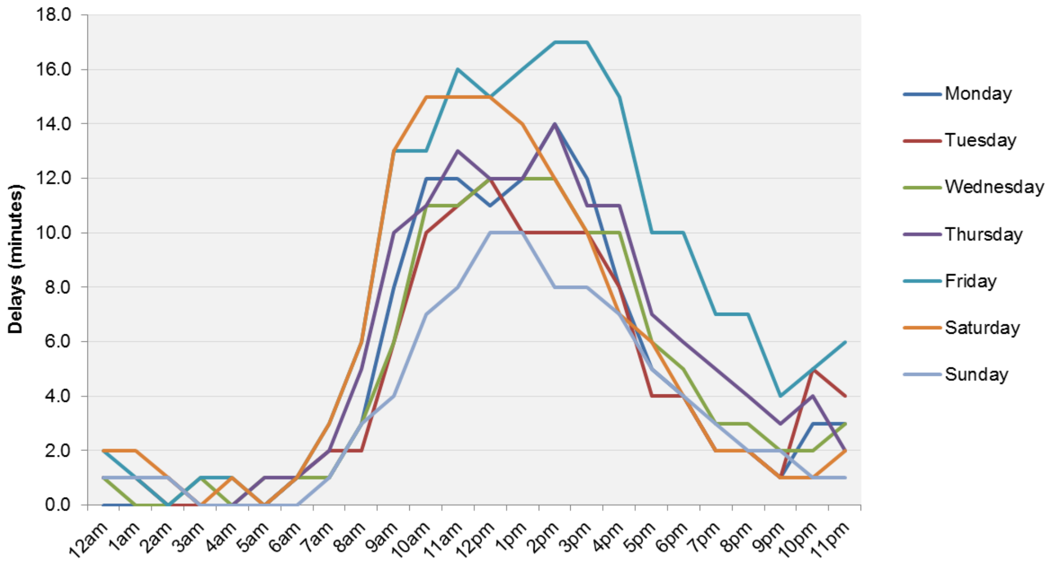

Figure F-1: Average Wait Times for Passenger Vehicles Crossing at Sweet Grass, Southbound

Source: UCSD (2014)

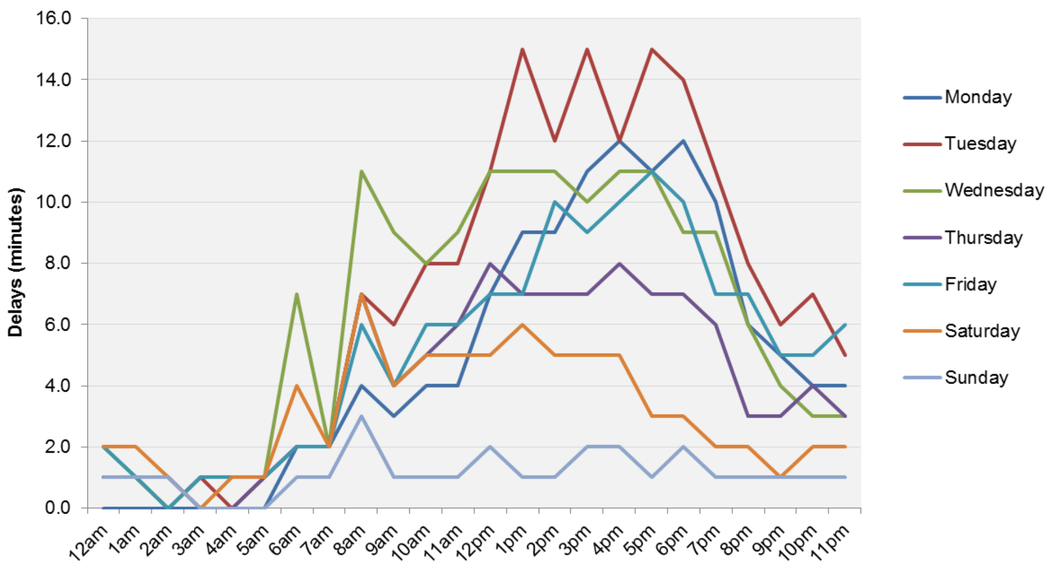

Figure F-2: Average Wait Times for Commercial Vehicles Crossing at Sweet Grass, Southbound

Source: UCSD (2014)

APPENDIX G: TRAFFIC DATA FOR CONNECTING HIGHWAY CORRIDORS

This appendix provides historical traffic data by count site along the S-232 and US 191 corridors. It also includes total AADT and Truck AADT in all ICED 1 highway corridors, as well as average directional split and level of service for these corridors.

Table G-1: Traffic Count Sites in the S-232 Corridor

Count Site ID	Departmental Route	Section Length	Section Description
2-14	S-232	4.934	JCT COUNTY RD 250 N
2-3	S-232	6.088	JCT COUNTY RD 230 N
2-2	S-232	8.467	JCT COUNTY RD 160 N
2-1	S-232	15.582	JCT COUNTY RD 50 N
4A-20	S-232	5.154	JCT S-233
4A-19	S-232	0.918	JCT 31ST ST N
4A-66	S-232	1.641	JCT U-5711 (5TH ST N) AT UL
4A-54	U-5711	0.390	JCT 7TH AVE / 5TH ST N
4A-53	U-5711	0.174	JCT 2ND ST N
4A-52	U-5711	0.193	LV HAVRE CL; JCT N-1 (1ST ST)
Total		**43.541**	

Source: MDT (2013a)

Table G-2: Traffic Count Sites in the US 191 Corridor

Count Site ID	Departmental Route	Section Length	Section Description
1-4	N-99	6.213	JCT BORDER RD
1-3	N-99	9.682	JCT LOCAL RD
1-2	N-99	3.234	JCT LOCAL RD
1-1	N-99	11.545	JCT S-208
3-6	N-99	22.449	JCT HOPGLAN ADDITION
3-19	N-99	0.861	JCT N-1 W OF MALTA
Total		**53.984**	

Source: MDT (2013a)

Table G-3: AADT in the S-232 Corridor, All Vehicles, 1997 – 2012

Count Site ID	2-14	2-3	2-2	2-1	4A-20	4A-19	4A-66	4A-54	4A-53	4A-52	Simple Average	Weighted Average
1997	90	130	160	340	450	660	1,000	2,020	3,480	3,560	**1,189**	**334**
1998	120	160	230	320	370	620	890	1,520	2,810	2,860	**990**	**323**
1999	150	220	230	380	430	710	1,160	1,860	3,380	3,400	**1,192**	**383**
2000	90	150	200	340	410	700	1,050	1,970	3,610	3,290	**1,181**	**341**
2001	120	150	220	310	390	670	950	1,670	3,230	3,460	**1,117**	**328**
2002	170	200	260	360	450	670	1,060	1,890	3,480	3,540	**1,208**	**380**
2003	205	235	275	420	505	750	1,165	1,960	3,475	3,010	**1,200**	**424**
2004	240	270	290	480	560	830	1,270	2,030	3,470	3,170	**1,261**	**471**
2005	110	140	180	280	350	640	940	1,510	3,620	3,330	**1,110**	**300**
2006	110	140	180	280	350	640	960	1,510	3,630	3,340	**1,114**	**301**
2007	110	140	180	280	350	640	930	1,460	3,510	3,230	**1,083**	**299**
2008	130	210	250	370	400	620	1,030	1,410	3,400	3,130	**1,095**	**364**
2009	120	210	250	360	390	610	1,050	1,440	3,700	3,760	**1,189**	**363**
2010	150	210	250	360	390	610	1,110	2,270	3,920	3,980	**1,325**	**378**
2011	170	220	270	370	500	760	1,180	2,260	3,530	4,870	**1,413**	**411**
2012	160	180	180	320	400	630	910	1,780	3,310	4,830	**1,270**	**338**

Source: MDT (2013a)

Table G-4: Truck AADT in the S-232 Corridor, All Truck Types, 1997 – 2012

Count Site ID	2-14	2-3	2-2	2-1	4A-20	4A-19	4A-66	4A-54	4A-53	4A-52	Simple Average	Weighted Average
1997	-	-	-	-	-	-	-	-	-	-	**-**	**-**
1998	25	-	-	69	69	112	194	-	-	-	**-**	**-**
1999	-	-	-	69	69	112	194	-	-	-	**-**	**-**
2000	-	-	-	69	69	112	194	-	-	-	**-**	**-**
2001	-	-	-	69	69	112	194	-	-	-	**-**	**-**
2002	25	25	25	25	25	70	70	-	-	-	**-**	**-**
2003	25	25	25	25	25	85	85	150	150	150	**75**	**31**
2004	25	25	25	25	25	85	85	150	150	150	**75**	**31**
2005	25	25	25	25	25	85	85	150	150	150	**75**	**31**
2006	25	25	25	25	25	85	85	150	150	150	**75**	**31**
2007	25	25	25	25	25	85	85	150	150	150	**75**	**31**
2008	25	25	25	25	25	85	85	150	150	150	**75**	**31**
2009	22	22	22	22	22	85	85	150	150	150	**73**	**28**
2010	29	29	29	29	29	85	85	150	150	150	**77**	**34**
2011	25	25	25	25	25	85	85	150	150	150	**75**	**31**
2012	21	21	21	21	21	91	91	150	150	150	**74**	**27**

Source: MDT (2013a)

Table G-5: AADT in the US 191 Corridor, All Vehicles, 1997 – 2012

Count Site ID	1-4	1-3	1-2	1-1	3-6	3-19	Simple Average	Weighted Average
1997	50	100	150	120	240	580	**207**	**167**
1998	80	100	130	170	320	860	**277**	**218**
1999	80	100	160	150	350	610	**242**	**224**
2000	110	110	170	130	290	690	**250**	**202**
2001	105	120	170	170	310	600	**246**	**219**
2002	100	130	170	150	310	610	**245**	**216**
2003	80	110	160	150	300	710	**252**	**207**
2004	70	100	130	140	310	720	**245**	**204**
2005	80	100	160	120	380	800	**273**	**233**
2006	80	100	160	120	380	800	**273**	**233**
2007	20	110	150	130	320	910	**273**	**206**
2008	50	110	130	140	300	900	**272**	**202**
2009	50	60	110	110	290	890	**252**	**181**
2010	80	60	110	110	300	910	**262**	**189**
2011	70	110	130	130	300	850	**265**	**202**
2012	70	100	120	120	270	740	**237**	**183**

Source: MDT (2013a)

Table G-6: Truck AADT in the US 191 Corridor, All Truck Types, 1997 – 2012

Count Site ID	1-4	1-3	1-2	1-1	3-6	3-19	Simple Average	Weighted Average
1997	27	27	27	27	47	47	**34**	**36**
1998	27	27	27	27	47	47	**34**	**36**
1999	27	27	27	27	47	47	**34**	**36**
2000	17	17	17	17	33	33	**22**	**24**
2001	17	17	17	17	36	36	**23**	**25**
2002	17	17	17	17	36	36	**23**	**25**
2003	20	20	20	20	56	56	**32**	**36**
2004	16	16	16	16	35	35	**22**	**24**
2005	15	15	15	15	31	31	**20**	**22**
2006	15	15	15	15	31	31	**20**	**22**
2007	15	15	15	15	39	39	**23**	**25**
2008	15	15	15	15	22	22	**17**	**18**
2009	10	10	10	10	22	22	**14**	**15**
2010	16	16	16	16	22	22	**18**	**19**
2011	12	12	12	12	22	22	**15**	**16**
2012	16	16	16	16	41	41	**24**	**27**

Source: MDT (2013a)

Table G-7: Traffic Growth in the ICED 1 Highway Corridors, 1998 – 2012

Route	From	To	AADT (Non-Weighted)				Annualized Growth Rate		
			1998*	2008	2011	2012	1998-2008	2008-2012	1998-2012
S-232	**Havre**	**Wild Horse**	**990**	**1,095**	**1,413**	**1,270**	**1.0%**	**3.8%**	**1.8%**
US 191	**Malta**	**Morgan**	**277**	**272**	**265**	**237**	**-0.2%**	**-3.4%**	**-1.1%**
I-15	Shelby	Sweet Grass	2,197	2,245	2,648	2,252	0.2%	0.1%	0.2%
S-233	Havre	Willow Creek	922	1,026	1,340	1,226	1.1%	4.6%	2.1%
S-241	Harlem	Turner	484	366	394	420	-2.7%	3.5%	-1.0%
MT-24	Glasgow	Opheim	382	341	381	461	-1.1%	7.8%	1.4%
MT-13	Macon	Scobey	756	674	767	777	-1.1%	3.6%	0.2%
S-251	Sprote	Flaxville	135	160	202	187	1.7%	3.9%	2.3%
S-511	Flaxville	Whitetail	171	118	220	208	-3.6%	15.2%	1.4%
MT-16	Culbertson	Plentywood	1,858	1,648	2,039	2,195	-1.2%	7.4%	1.2%
MT-16	Plentywood	Raymond	565	645	735	703	1.3%	2.2%	1.6%

*Note: * Data may be incomplete*
Source: MDT (2013a)

Table G-8: Growth in Truck Traffic in the ICED 1 Highway Corridors, 1998 – 2012

Route	From	To	Truck AADT (Non-Weighted)**				Annualized Growth Rate		
			1998*	2008	2011	2012	1998-2008	2008-2012	1998-2012
S-232	**Havre**	**Wild Horse**	**47**	**75**	**75**	**74**	**4.7%**	**-0.3%**	**3.3%**
US 191	**Malta**	**Morgan**	**34**	**17**	**15**	**24**	**-6.4%**	**8.9%**	**-2.3%**
I-15	Shelby	Sweet Grass	727	723	821	799	-0.1%	2.5%	0.7%
S-233	Havre	Willow Creek	48	74	75	76	4.5%	0.8%	3.4%
S-241	Harlem	Turner	49	40	42	57	-2.1%	9.3%	1.1%
MT-24	Glasgow	Opheim	43	31	36	67	-3.3%	21.2%	3.2%
MT-13	Macon	Scobey	42	50	73	78	1.9%	11.7%	4.6%
S-251	Sprote	Flaxville	36	39	61	38	0.8%	-0.6%	0.4%
S-511	Flaxville	Whitetail	9	4	12	19	-7.8%	47.6%	5.5%
MT-16	Culbertson	Plentywood	136	175	293	291	2.6%	13.5%	5.6%
MT-16	Plentywood	Raymond	85	88	135	112	0.3%	6.2%	2.0%

*Note: * Data may be incomplete; ** Including all truck types (5..13)*
Source: MDT (2013a)

Table G-9: Average Directional Split in the ICED 1 Highway Corridors, 1998 – 2012

Route	From	To	Percentage of AADT in Southbound Direction		
			1998	2007	2011
S-232	**Havre**	**Wild Horse**	**64%**	**52%**	**51%**
US 191	**Malta**	**Morgan**	**57%**	**53%**	**51%**
I-15	Shelby	Sweet Grass	57%	53%	51%
S-233	Havre	Willow Creek	64%	52%	55%
S-241	Harlem	Turner	63%	51%	50%
MT-24	Glasgow	Opheim	58%	54%	52%
MT-13	Macon	Scobey	58%	54%	51%
S-251	Sprote	Flaxville	63%	51%	50%
S-511	Flaxville	Whitetail	63%	51%	58%
MT-16	Culbertson	Plentywood	57%	53%	50%
MT-16	Plentywood	Raymond	57%	53%	53%

Source: MDT (2013a)

Table G-10: Level of Service and Congestion Index in the ICED 1 Study Area

Route	From	To	Level of Service	Congestion Index
S-232	**Havre**	**Wild Horse**	**A**	**93**
US 191	**Malta**	**Morgan**	**A**	**95**
I-15	Shelby	Sweet Grass	A	97
S-233	Havre	Willow Creek	A	96
S-241	Harlem	Turner	A	92
MT-24	Glasgow	Opheim	A	90
MT-13	Macon	Scobey	A	89
S-251	Sprote	Flaxville	A	95
S-511	Flaxville	Whitetail	A	96
MT-16	Culbertson	Plentywood	A	85
MT-16	Plentywood	Raymond	A	89

Note: Based on 2007 traffic; excluding segments within urban areas
Source: MDT (2013d)

APPENDIX H: TORNADO DIAGRAMS

Tornado diagrams are designed to help identify "critical" risk factors (i.e., those input variables that contribute most to the dispersion of simulated output). The variables at the top, with the longest "branches", are those that have the most influence. The figures below are provided for information. They are not referenced explicitly in the text.

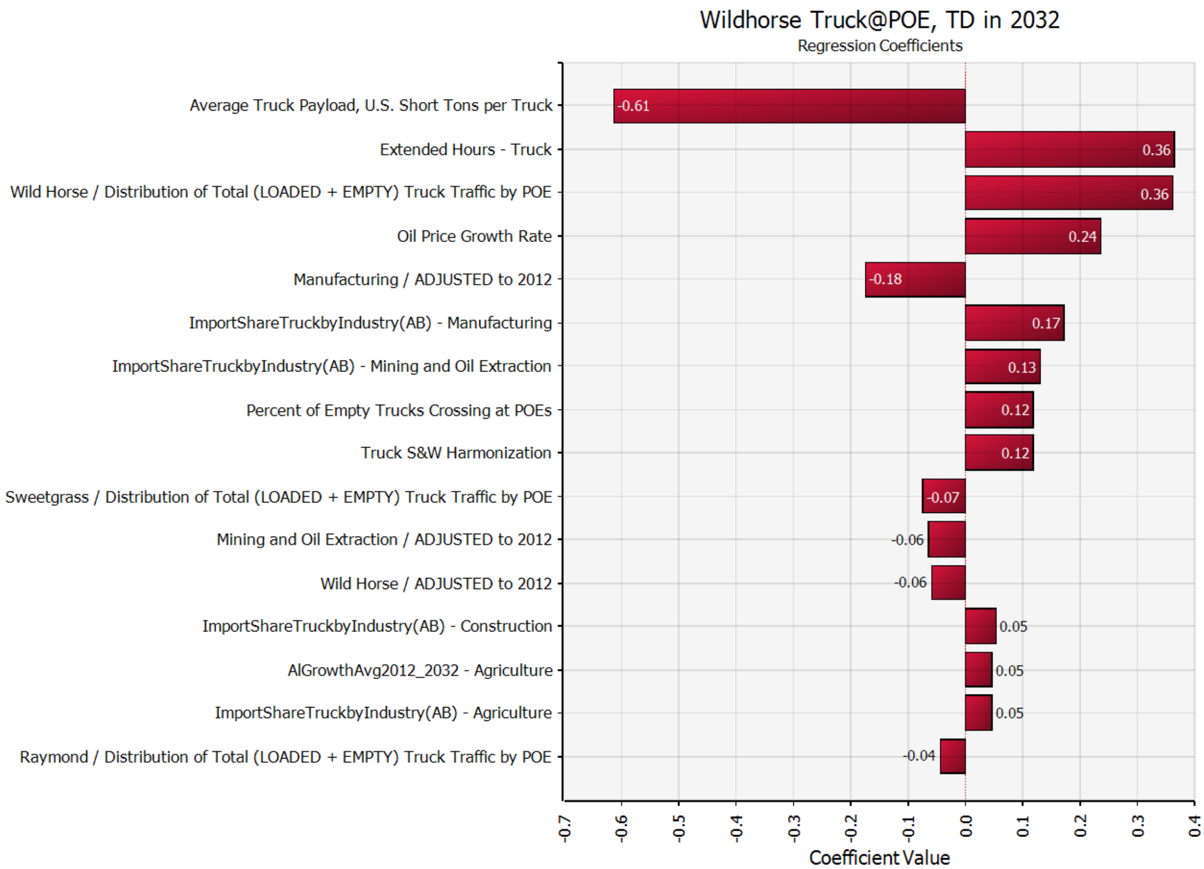

Figure H-1: Tornado Diagram, 2032 Truck Traffic Forecast at Wild Horse POE

Source: HDR Analysis

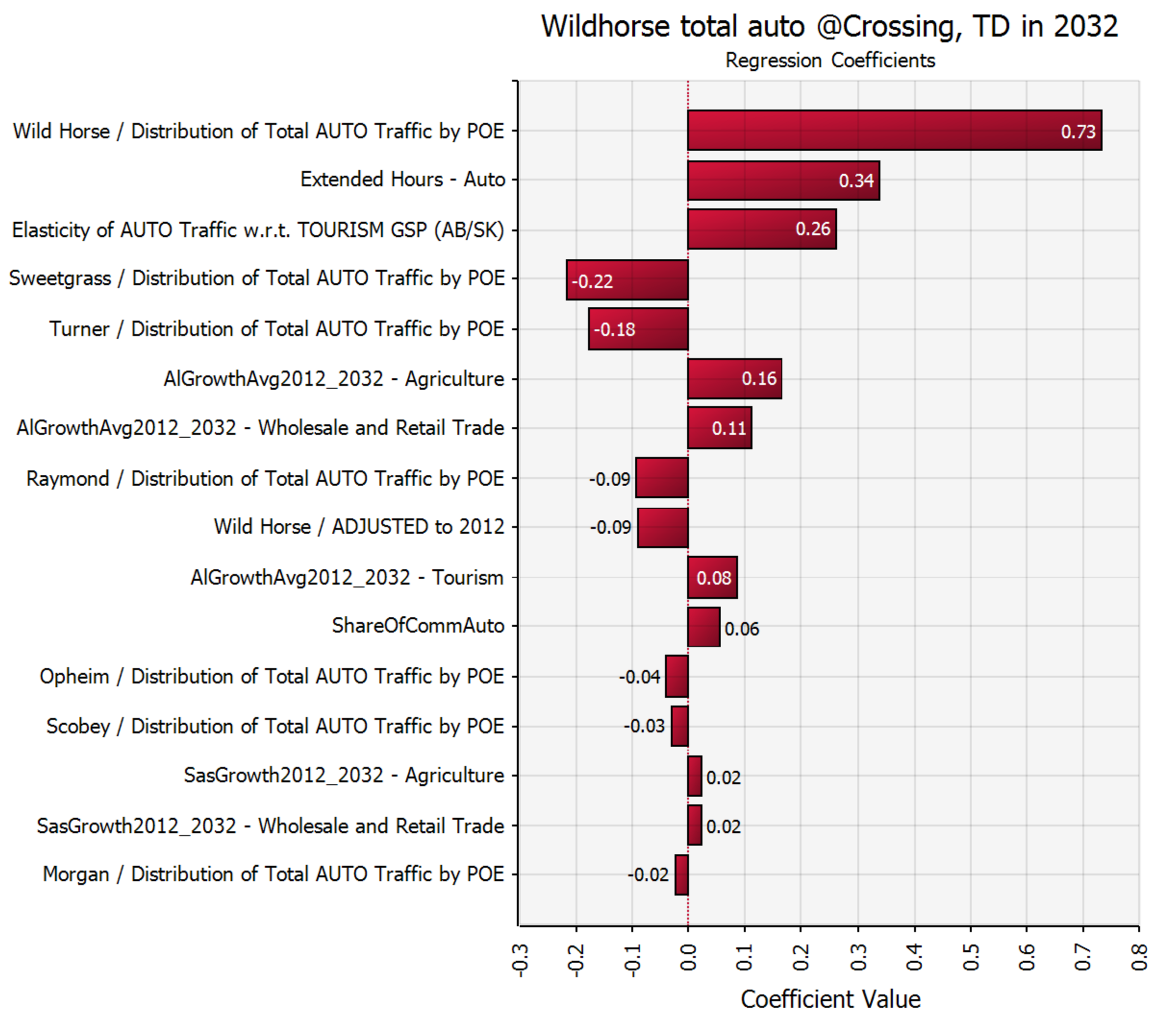

Figure H-2: Tornado Diagram, 2032 Auto Traffic Forecast at Wild Horse POE

Source: HDR Analysis

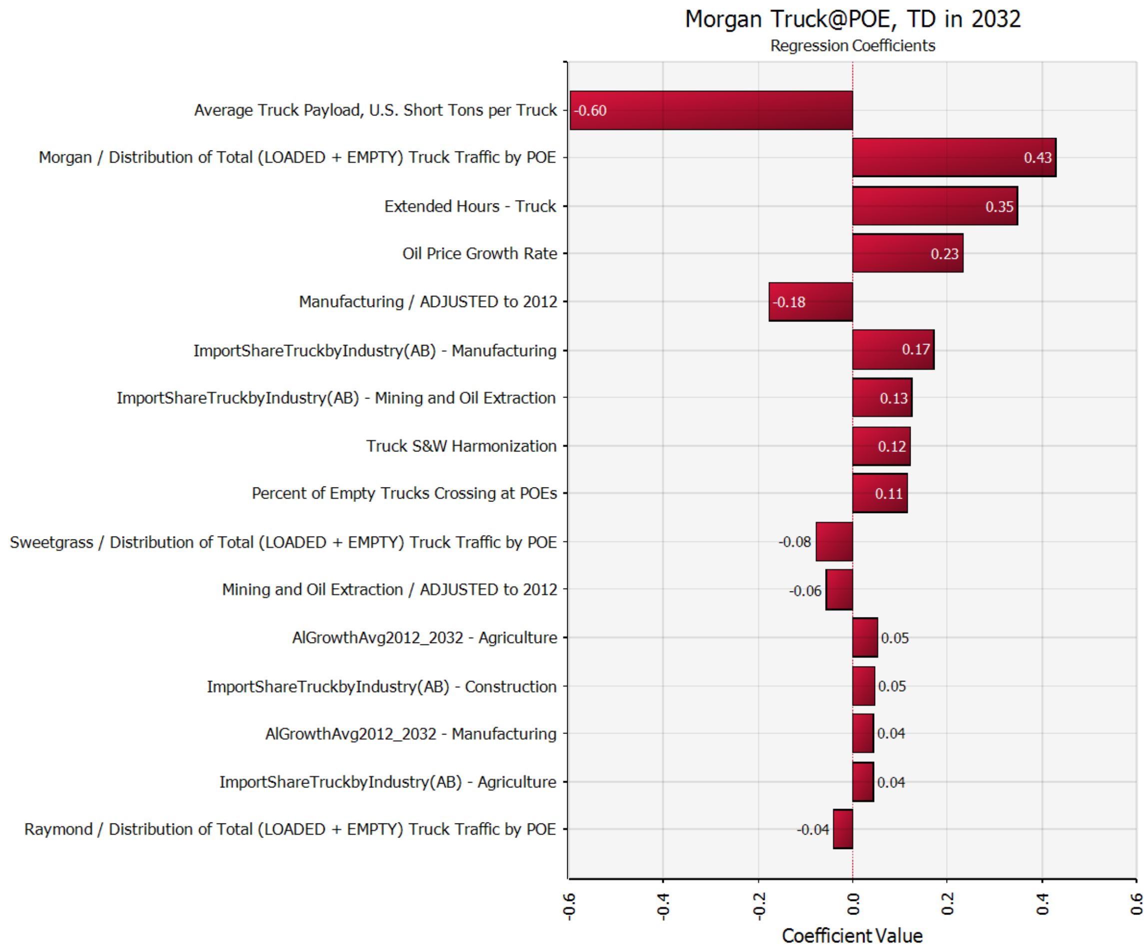

Figure H-3: Tornado Diagram, 2032 Truck Traffic Forecast at Morgan POE

Source: HDR Analysis

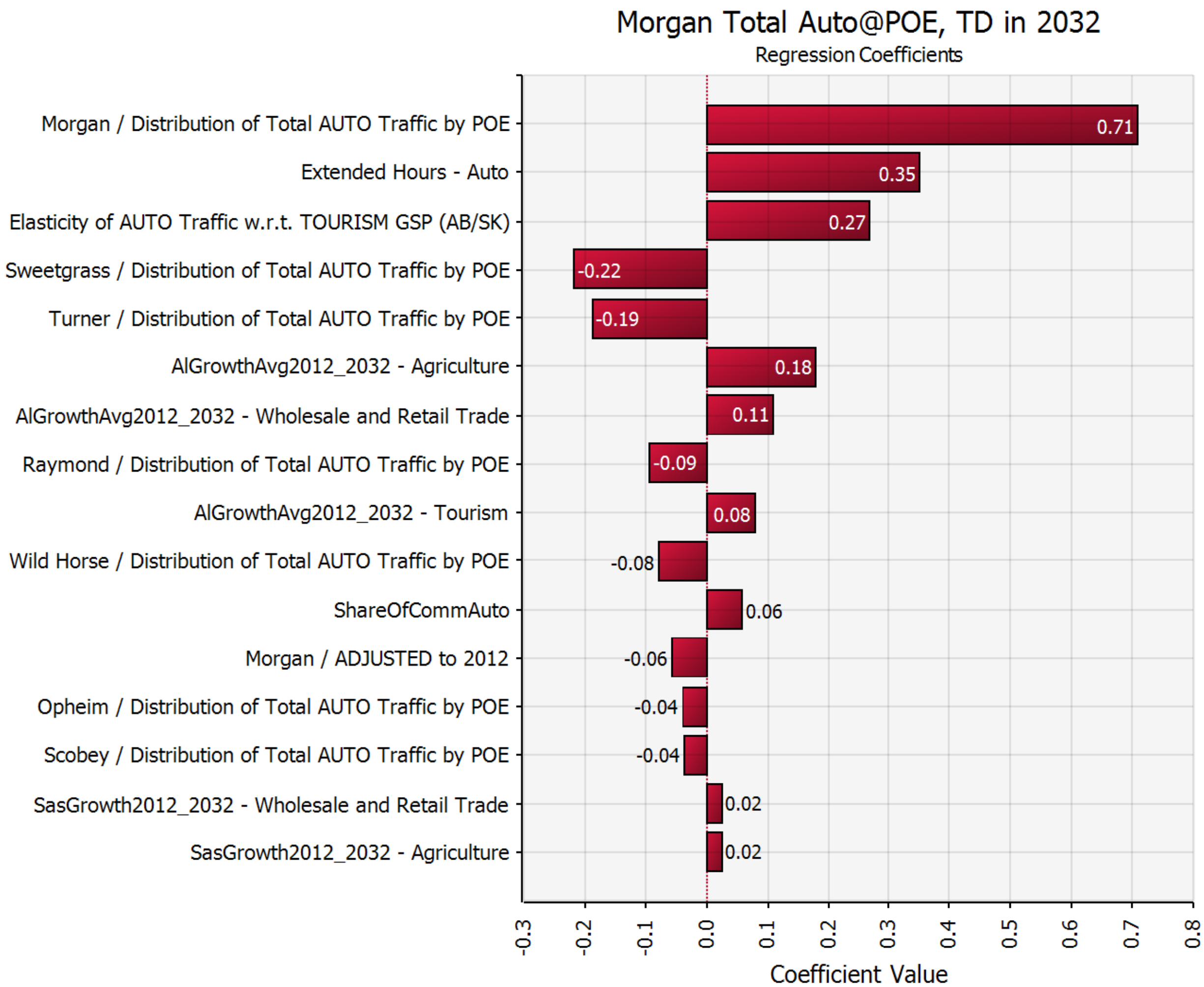

Figure H-4: Tornado Diagram, 2032 Auto Traffic Forecast at Morgan POE

Source: HDR Analysis

APPENDIX I: HIGHWAY PERFORMANCE MEASURES

One basic metric of highway performance is traffic volumes in relation to vehicle capacity. Level of Service (LOS) is one common method of measurement. When the capacity of a roadway is exceeded, this results in congestion and a poor LOS. Six levels of service, ranging from A to F, are used to define congestion and operating conditions on roadways, with LOS A representing the best operating conditions (free-flowing traffic) and LOS F the worst operating conditions (fully congested, stop-and-go traffic).

LOS for two-lane, Class I highways (primary arterials connecting major traffic generators, daily commuter routes, primary links to state or national highway networks) is illustrated in Table I-1, according to highway capacity standards.

Table I-1: Level of Service Criteria for Two-Lane Highways in Class I

Level of Service (LOS)	Level of Service Definition	Percent of Time Spent Following Other Vehicles	Average Vehicle Speed (mph)
A	Motorists can travel at their desired speed. No more than 35% of the time is spent following other vehicles.	35%	55
B	Average speed of 50–55 mph. Demand for passing is high. 50% of the time is spent following other vehicles.	35–50%	50–55
C	Average speed of 45–50 mph. Noticeable increase in following traffic with reduction in passing opportunities.	50–65%	45–50
D	Unstable traffic flow. Passing demand is high but passing opportunities approach zero. Vehicles following length of 5 to 10 vehicles and average speeds of 40–45 mph.	65–80%	40–45
E	Average speed below 40 mph. 80% of the time is spent following other vehicles. Passing is virtually impossible	80%	40
LOS F applies whenever the number of vehicles traveling on the highway exceeds the roadway capacity.			

Source: TRB (2000)

MDT uses the Congestion Index (CI) as a performance measure on its rural highway system. The CI is a measure of travel delay, where a higher CI means that travelers experience less congestion and greater mobility. CI values range from 0 to 100 and are a numerical representation of LOS, as shown in Table I-2.

Table I-2: Congestion Index and Corresponding Level of Service

Congestion Index	Level of Service
85–100	A
70–84	B
55–69	C
40–54	D
25–39	E
0–24	F

Source: MDT (2013c)

MDT uses several performance measures to track pavement conditions, including:

- Ride Index – Determined by using an internationally applied roughness index in inches per mile, and converting to a 0 to 100 scale.
- Rut Index – Calculated by converting rut depth to a 0 to 100 scale. Rut measurements are taken approximately every foot and averaged into one-tenth mile reported depths.
- Alligator Crack Index (ACI) – Measured by combining all load associated cracking, and converting the index into a 0 to 100 scale.
- Miscellaneous Cracking Index (MCI) – Calculated by combining all non-load associated cracking, and converting the index into a 0 to 100 scale.

Table I-3 indicates how these indices should be interpreted.

Table I-3: Interpretation of Pavement Condition Indices

	Pavement Condition		
	Good	Fair	Poor
Ride Index	80 – 100	60 – 79.9	0 – 59.9
Rut Index	60 – 100	40 – 59.9	0 – 39.9
Alligator Crack Index	80 – 100	60 – 79.9	0 – 59.9
Miscellaneous Cracking Index	80 – 100	60 – 79.9	0 – 59.9

Source: MDT (2007)

APPENDIX J: SUMMARY OF SAFETY DATA

This appendix includes maps illustrating the location of accidents in the S-232 and US 191 corridors. All accidents recorded between 2003 and 2012 are shown.

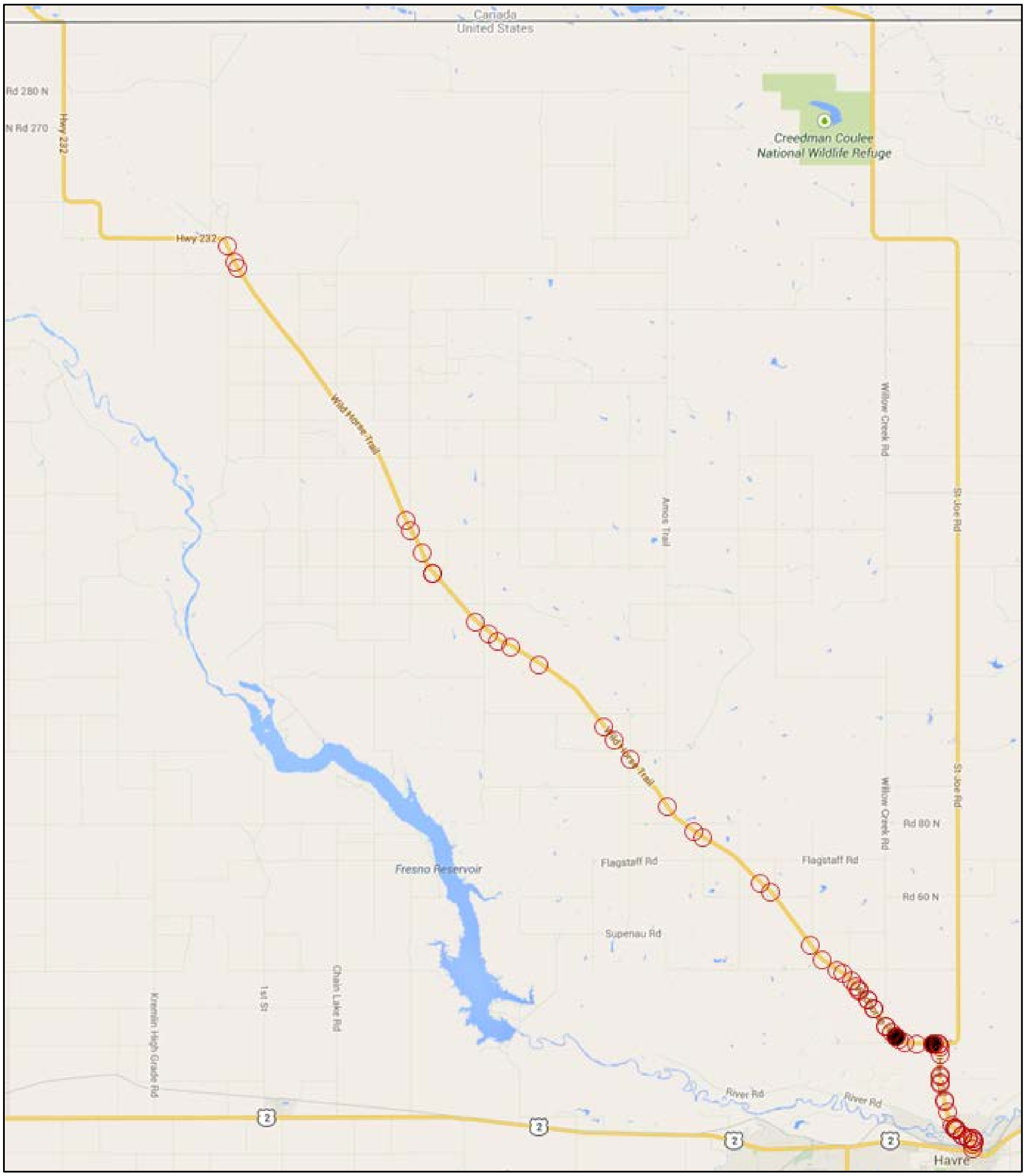

Figure J-1: Location of Accidents in the S-232 Corridor, Total over 2003 – 2012

Sources: Google (2013a) and HDR, with data from MDT (2013e)

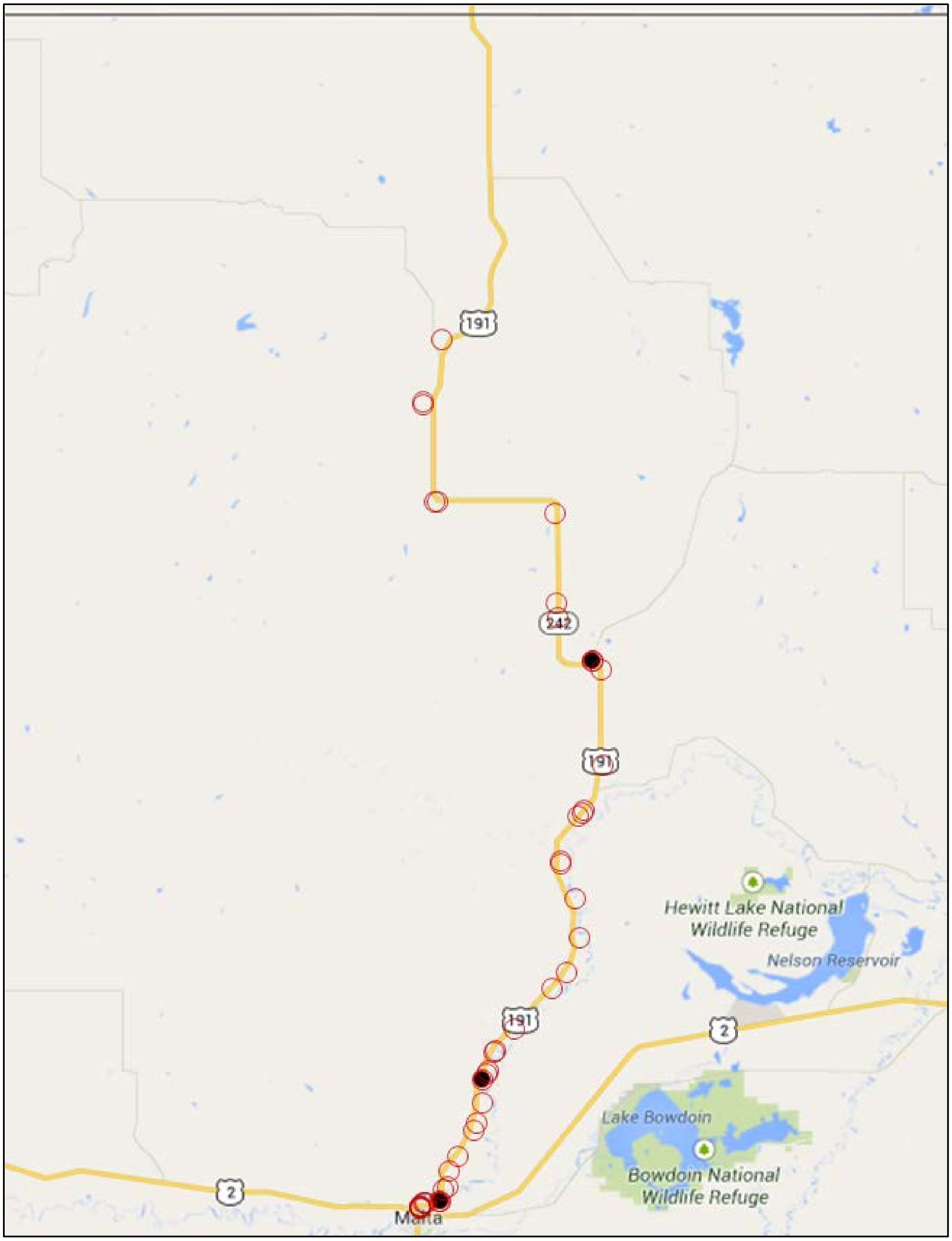

Figure J-2: Location of Accidents in the US 191 Corridor, Total over 2003 – 2012

Sources: Google (2013c) and HDR, with data from MDT (2013e)

APPENDIX K: PLANNED INFRASTRUCTURE IMPROVEMENTS

Figure K-1 below shows MDT's proposed highway improvement projects within the S-232 corridor.

- **UPN 7889:** Reconstruction project on S-232, North of Havre, for safety improvements (1.2 mile, at an estimated cost of 1 to 5 million dollars), in Fiscal Year 2014
- **UPN 6814:** Rehabilitation of a 22-mile section of US-87, West of Havre (at an estimated cost in excess of $5 million), in Fiscal Year 2015
- **UPN 7983:** Rehabilitation of bridge deck on Highway U5711, locally known as 7th Avenue North, Havre (at an estimated cost of $1 to $5 million), in Fiscal Year 2017

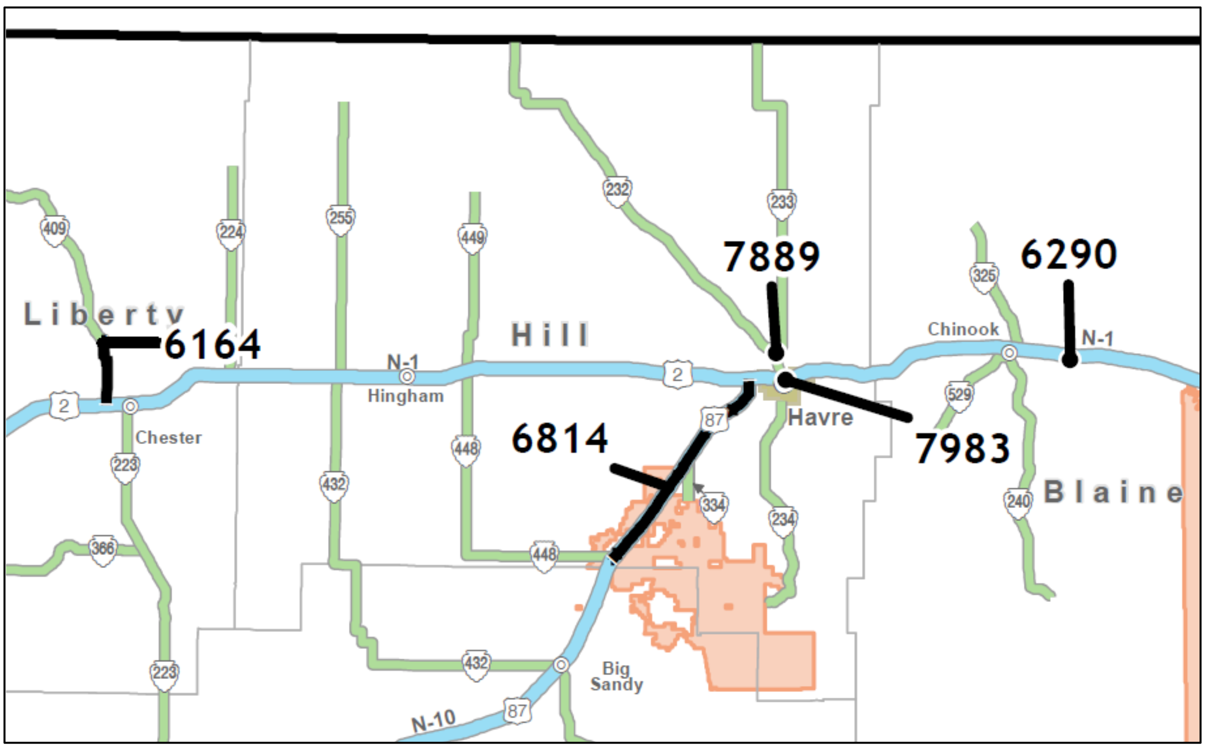

Figure K-1: Major Highway Projects in Hill County, Great Falls District Area

Source: MDT (2014)

Figure K-2 shows MDT's proposed highway improvement projects within the US 191 corridor.

- **UPN 4055:** Major rehabilitation of an 11-mile section of US 191 North of Malta (at an estimated cost in excess of $5 million), in Fiscal Year 2015
- **UPN 8128:** Rehabilitation of bridge deck at multiple locations along US-2, US-191, S-243 and S-537, in the Saco-Hinsdale area, East of Malta (at an estimated cost of $1 to $5 million), in Fiscal Year 2015

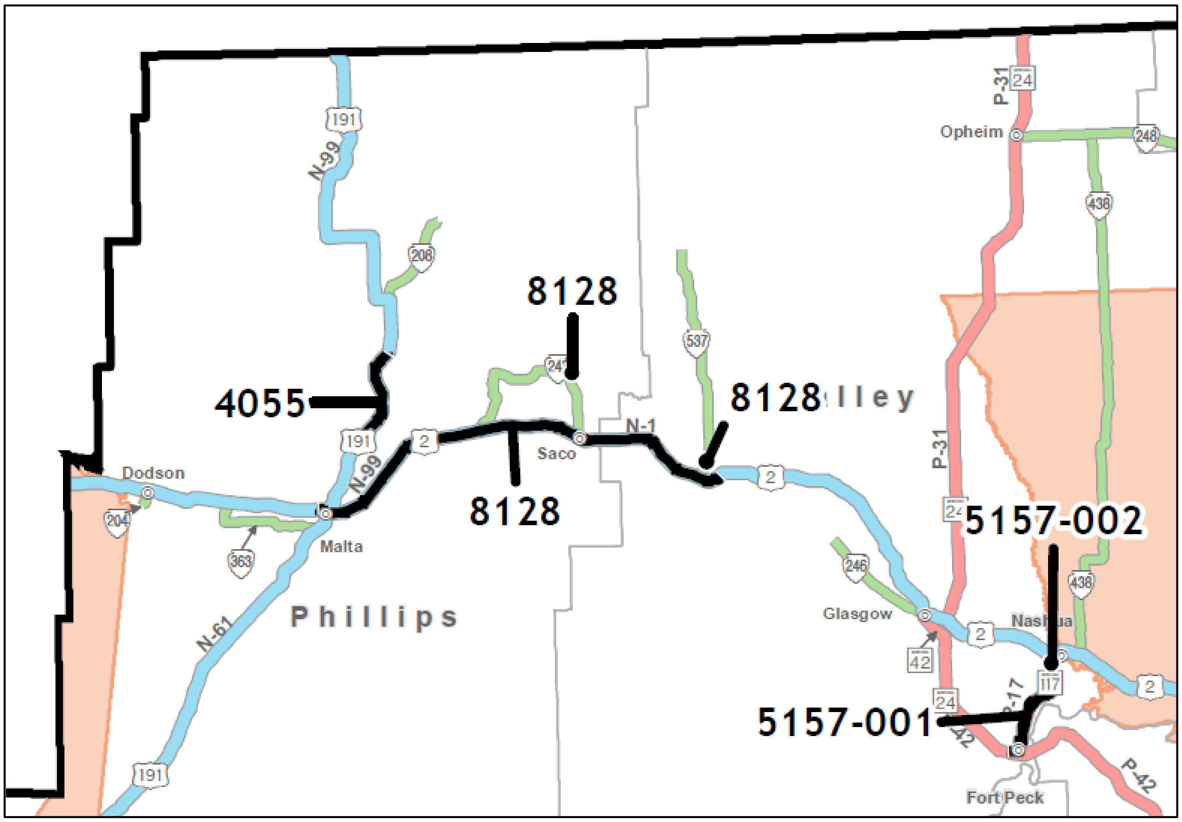

Figure K-2: Major Highway Projects in Phillips County, Great Falls District Area

Source: MDT (2014)

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