

**The U.S.-Canada Border:
Cost Impacts, Causes, and Short to Long Term Management
Options**

by

**Dr. John C. Taylor
Dr. Douglas Robideaux
Associate Professors
Seidman School of Business
Grand Valley State University
Grand Rapids, Michigan**

and

**Dr. George C. Jackson
Associate Professor
Wayne State University
Detroit, Michigan**

for the

**Michigan Department of Transportation
U.S. Department of Transportation
New York State Department of Transportation**

May 21, 2003

EXECUTIVE SUMMARY

This report summarizes the results of a research project aimed at estimating the costs of border crossing transit time and uncertainty, and other border related costs, and their impact on the U.S. and Canadian economies. Secondary objectives related to developing an understanding of changes in traffic levels over time, understanding immediate post 9/11 impacts, and understanding the causes of extended border crossing times, and possible short term and long term solutions to the problem of extended transit times and uncertainty over those times. One long term solution, “an external perimeter” strategy is examined in light of the cost savings that would be possible, and in terms of possible benefits that might accrue from such a border management system.

The findings reported on here are based on a review of some 750 newspaper articles in 43 newspapers in both Canada and the U.S., a review of 45 border related reports, some 20 site visits to seven key crossings, and 173 interviews of manufacturers, carriers, brokers, trade associations, and other stakeholders. A key source for estimating primary inspection transit times (backup times) across the border for travel by autos and for trucks, for each direction of travel, was the Canada Customs archive of transit times. This archive was available for each of the key crossings, and allowed for detailed estimates of border crossing times along the entire U.S.-Canada border. Transit time data, site visits, and interviews took place during the summer of 2002, however, additional data was gathered for both the pre and post 9/11 time periods depending on the topic under study.

The key finding is that the present border management system and trade policies are costing the U.S. and Canadian economies an estimated US\$7.52 to 13.20 billion, with a most likely cost estimate of US\$10.3 billion. These costs relate to specific costs to carriers and manufacturers resulting from border transit times and uncertainty, other border related costs borne by manufacturers and carriers for duties, broker fees, customs administration, etc., and costs for inspection staffs borne by the two governments. The total costs represent 2.70% of merchandise trade totaling US\$382 billion in 2001. After adjusting out non-truck related costs, the total border costs related to trucking are estimated at US\$9.45 billion at the midrange, or some 4.02% of total truck trade totaling US\$270 billion in 2001. In addition to these quantified costs, the report examines a number of societal impacts of the border related to congestion, environmental issues, truck safety, and the need for immediate investment dollars.

Other key findings relate to changes in traffic levels long term, and pre 9/11 to post 9/11. Volume changes from 1984 to 2001 and from 1995-2001 are presented in the report. For the 9 months from September to June pre 9/11, compared to the same months post 9/11, auto traffic into the United States fell 14.98% border-wide, and truck traffic fell 2.19%. During this time period industrial production in the U.S. was down 3.66%, while auto production was actually up, however, imports to the U.S. from Canada were down by 10.8%. This suggests that U.S. buyers had some concerns about buying from Canada, perhaps in part because of real or perceived concerns about current and/or future border conditions. Several other macro indicators of a border effect were reviewed, including an examination of cross-border freight rates which suggests these charges are US\$1.59 billion higher than would be the case for comparable domestic freight movements.

A final category of findings address the causes of extended transit times for entry to the U.S. Backups continue to be due to a combination of factors, including those related to a lack of sufficient federal inspection service (FIS) inspection booths at high volume crossings, an inability to staff all booths at times of high volumes due to a lack of staff, and a variety of problems with participation in and the

effectiveness of secondary yard processes for trucks. However, the single largest problem continues to be, as was the case pre 9/11, an inability to staff all available booths at times of backup incidents. While there has been progress on this issue since 9/11, and all available truck booths are being staffed much more frequently than pre 9/11, most delay incidents observed during our site visits occurred when not all booths were being staffed.

Possible solutions are categorized into short to medium term ones, and long term ones. Short to medium term solutions should focus primarily on increasing FIS staff levels, a process that is well underway, and procedures to make sure that both primary and secondary inspection facilities are adequately staffed, and that such staffing is augmented when backups due begin. It will also be necessary to increase the number of primary inspection booths at some crossings, given the longer processing times than were typical pre 9/11, and likely increases in traffic in the future. At a few crossings, with downtown city truck routes, such as at Calais-St. Stephens and at Detroit-Windsor, it will also be necessary to consider new access/egress routes that can help alleviate backups on city streets. Finally, much more needs to be done to increase participation in existing programs that allow carriers to avoid secondary, and more needs to be done to improve execution of these programs by brokers, drivers, and other stakeholders. Driver education is a major problem that needs considerable work.

Long term, there are two approaches to dealing with the U.S.-Canada border. One approach is to invest in sufficient new border crossings and staff to facilitate trade and maintain border security. This could mean upwards of several billions of dollars for facilities and ongoing FIS staff needs. While these investments could help facilitate trade, there is some question about the degree of security that can be provided on a border between two countries with this level of economic integration and cross-border trade and transportation. Efforts to increase security, including various new controls on travel by non-nationals, and proposals for various advance notices of freight movements, could impede commerce regardless of the level of investment in facilities and staff at key guarded crossings.

One alternative that has gained considerable attention in Canada is the concept of an “external perimeter” approach to the border between the U.S. and Canada. The most advanced version of this approach would result in border inspections being conducted on the U.S. and Canada’s external borders, with a change in emphasis on the internal border to one of random inspections and post audits with severe penalties for violations of each countries laws and/or trade policies. Such a system, would of course require Canada to more closely integrate its immigration policies with those of the United States. In addition, such an approach would provide additional incentives for the U.S. and Canada to further integrate trade policies. The benefit from such an approach would be potential elimination of most of the US\$10.3 billion in cost impacts from the current system, a savings equal to 2.70% of the value of all current merchandise trade.

INTRODUCTION

The U.S. and Canada are the world's two largest trading partners and experienced rapid growth in trade volumes over the last decade. And while much of the trade growth can be traced to the NAFTA and predecessor U.S.-Canada FTA, the NAFTA itself did little to liberalize or modernize border crossing processes. In fact, while the border is often referred to as the longest undefended boundary in the world, many of the trade, immigration, and border control policies that the two countries employ are rooted in age old concepts that were originally designed to collect duties of various kinds and control the flow of investment and peoples. These policies and processes had a significant cost impact on the economies of the two countries prior to 9/11, and these cost impacts have increased since border security was tightened post 9/11. This tightening of the border has led to longer transit times, and more importantly, an increase in uncertainty about the time that border crossings will take.

The primary purpose of this report is to document the specific costs of the border related to transit time and uncertainty, and to document other general costs related to border trade policies and procedures. An understanding of these costs will be important in estimating the benefits that would accrue from any possible changes in the way the border is managed in the future. The report also addresses the impact of 9/11 on traffic and trade levels, and examines several macro indicators of border impacts related to tourism levels, freight rates, and assumed crossing time costs. The last objective is to report on the causes of extended border crossing transit times, and to suggest possible short term and long term solutions that could lower these costs and speed the flow of traffic while enhancing security. One such alternative, an "external perimeter" strategy, is considered in the last section of the report focusing on major implications of this work. Problems with the present border managements system, and the potential benefits of a long term shift in strategy towards the "perimeter" model are considered in this section.

This report follows in the steps of a number of initiatives designed to improve border operations and improve international cargo security. These steps have included moves towards inspections at first points of entry to North America for ocean freight, and a number of initiatives to increase staffing at the borders. Additional initiatives have been aimed at speeding the flow of cargo and traffic for frequent travelers, and for secure importers, exporters and carriers that are responsible for the vast majority of cargo movements. At the same time, numerous reports have noted the difficulties travelers and carriers have encountered at the border as a result of stepped up security and a shortage of federal inspection services (FIS) staff. The purpose of this report is not to highlight these problems, or to add another voice of criticism to overburdened FIS. Instead, the purpose of the report is to document the costs of the border overall, to provide insights into the ways in which border policies and uncertainty over border crossing times can affect the economy, and to explore alternative border management strategies such as the "external perimeter" one.

The full report consists of this executive summary and overview, summary tables, and a set of more detailed appendixes included at the end of this overview. These appendixes cover a variety of topics, but most importantly include the detailed calculations of both macro and detailed cost impacts. The appendixes are numbered from I-X and include the following sections:

- Appendix I - Objectives, Analysis Outputs and Methodology
- Appendix II - Sources and Interviews
- Appendix III - Traffic Volume Changes

Appendix IV - Economic, Trade and Traffic Changes Pre to Post 9/11
Appendix V - Immediate Post 9/11 Impact
Appendix VI - Macro Level Border Impacts
Appendix VII –Primary Inspection Transit Time Data
Appendix VIII- Detailed Cost Impact Discussion and Calculations

U.S.-CANADA TRADE AND TRANSPORTATION LEVELS

Trade Levels

Trade between the U.S. and Canada is of course the largest bilateral trading relationship in the world, with 2000's total trade in goods, services and income of US\$489 billion being some 52% greater than the trade with the U.S.'s number two trade partner – Japan (Canadian Embassy 2001). U.S.-Canada total trade has grown by 152%, or 13.8% per year since implementation of the U.S.-Canada Free Trade Agreement in 1989. U.S. exports of goods to Canada totaled US\$178.9 billion in 2000, or some 23% of all U.S. exports. The U.S. market is even more important to Canada's economy, with exports to the U.S. in 2000 totaling US\$230.8 billion and representing 87% of all Canadian exports. Trucks moved 72.6% of the value of exports from the U.S. to Canada, and 55.4% of the value of goods moving from Canada to the U.S. The U.S. and Canada are also major sources of foreign direct investment for each other, with US\$227 billion invested in each other's countries at the end of 2000.

For 2001, merchandise trade alone, excluding services and income flows, totaled US\$382 billion. This trade included US\$218 billion in U.S. imports from Canada, including US\$35 billion in energy. At the same time, U.S. exports to Canada totaled US\$164 billion. Truck borne trade alone, in both directions, totaled US\$235 billion in 2001, with US\$117 billion in goods imported to the U.S. by truck and US\$118 billion exported to Canada by truck. The total land borne merchandise trade was concentrated at several key ports, with Detroit-Windsor accounting for US\$91.9 billion of the two-way trade total. The Buffalo-Niagara frontier accounted for another US\$60.3 billion of the total, while Sarnia-Port Huron accounted for an additional US\$55.5 billion. Together, these three ports represent 59.9% of all land borne merchandise trade between the U.S. and Canada. Focusing just on truck borne trade, Detroit-Windsor trade totaled US\$79.7 billion, Buffalo-Niagara totaled US\$47.1 billion, and Sarnia-Port Huron totaled US\$29.8 billion. These three ports accounted for 66.7% of all truck borne trade.

Traffic Levels

This trade, investment, and personal travel results in a great deal of border crossing traffic. In 2001, 68.3 million personal vehicles crossed the U.S.-Canada border along with 13.4 million trucks. See Table 1 for summary details by key crossing and in total, and see Appendix III for additional detail. Personal vehicle travel was down a cumulative 11.89% from a peak of 77.5 million units in 1995, primarily because of an abnormally large volume of traffic in the mid 90's due to a stronger Canadian dollar, and high cigarette and gas taxes in Canada. Since 1995 the Canadian dollar has weakened and the provinces made major reductions in cigarette taxes. Personal vehicle traffic was up a cumulative 24.9% between 1984 and 2001. Commercial traffic grew 29.7% between 1995 and 2001, and 122.5% over the 17 years since 1984. To put this traffic volume into perspective, consider that personal vehicle traffic in 2001 averaged 7,799 units per hour over a 24 hour seven day a week year. Truck traffic averaged 1,526 units per hour over a 24X7 year.

Table 1 also points out the extreme concentration in traffic at several key crossings, and the extensive growth in traffic at these crossings. For instance, out of 130 border crossings, the four Ontario-Michigan crossings accounted for 35.9% of the northern border's total bidirectional truck traffic in 2001, and the Peace Bridge and Lewiston-Queenston Bridges in the Buffalo-Niagara area accounted for another 17.2% of the total. Truck traffic at Windsor-Detroit has grown 133.2% since 1984, by 86.6% at Niagara crossings, and by 446.5% at the Sarnia-Port Huron crossing. Traffic at the key Pacific Highway crossing between Washington and British Columbia grew by 152.0%.

It is important to note that the bulk of the truck traffic, with the exception of the Pac Highway crossing, crosses the border at locations that turn out to be key points for auto traffic as well, further congesting these crossings and straining the capacity of the existing bridges and tunnels over the river way border between the U.S. and Canada in these regions. In 2001, the 15.3 million autos crossing at the two Detroit-Windsor crossings represented 22.4% of total border traffic, with an average daily flow over a 365 day year of 41,918 autos per day, or 1,747 autos per hour over a 24 hour day. The four crossings at the Niagara frontier generated an additional 14.2 million bidirectional crossings, or 20.8% of total northern border auto crossing activity. In total, these six crossings account for 43.2% of all auto crossings at the northern border's 130 ports of entry. This concentrated volume of truck traffic at equally congested auto crossings points out some of the problems in trying to increase border security without leading to major delays and uncertainty that could have the effect of reducing trade and transportation.

U.S. Economic Activity, Imports From Canada and Inbound Truck Traffic Pre to Post 9/11

While trade and truck traffic grew substantially over the 90's, there has been a significant slowdown in Canadian exports to the U.S. since 9/11 and a slight reduction in truck traffic. Figure 1 shows U.S. economic activity, imports from Canada by land, and inward truck moves for the entire U.S.-Canada border for each of nine months pre-9/11 compared to the same nine months post 9/11. On a cumulative level, while the U.S. industrial production index was down 3.66%, and auto production was actually up 4.24% in the U.S., imports of goods by land from Canada fell 10.8%, and truck traffic entering the U.S. fell 2.2%. This fall-off in Canadian exports to the U.S. by land will be of considerable concern in Canada where a number of trade associations, such as the Canadian Association of Manufacturers and Exporters, have expressed fears that post 9/11 perceptions of border delays and uncertainty might have the effect of reducing exports to the U.S. (MacFarlane 2001, Dobson 2002, Lawson 2002, The Windsor Star 2002,). Given that economic activity in the U.S. over the nine month period was flat to up, and that the Canadian dollar value was relatively flat over this period, one would have expected imports from Canada to have fallen by no more than 3-4%. The fact that they fell 10.8% may in part be due to U.S. industrial buyer's concerns about the nature of the border now and in the future.

While actual border transit times are not dramatically longer than they were pre 9/11 there has been considerable publicity about border problems immediately after 9/11, and there is greater uncertainty today over the time it will take to cross the border. In addition, there has been considerable press about the need to "secure" the northern border, and this may have led to buyers having some qualms about using Canadian sources. Border crossing processes and procedures, and their costs, were coming under scrutiny pre-9/11 (Kenna 2001, National Post 2001, Tricky 2001) and have received much more attention in recent months.

Appendix IV provides additional information on changes in economic activity, trade, and traffic pre to post 9/11. Several figures graphically depict changes in the U.S., including inbound imports and traffic, and changes in Canada including imports and traffic entering Canada. Both truck traffic and auto traffic changes are depicted.

METHODOLOGY

In conducting this research a combination of secondary source reviews and site visit/personal interviews were used. These sources are summarized in a bibliography to this summary report, and in Appendix II. This information was used to make a variety of findings related to causes and solutions to border issues. The information gathered in these reviews was also used, along with a variety of assumptions, to identify categories of cost impacts at both the macro and detailed levels, and to make cost estimates for each category of potential costs. Examples of specific cost impacts at the detailed level include primary booth transit time (backups), secondary inspection yard processing time, reduced cycles for carriers, lost productivity from reduced trade, higher inventory carrying costs, customs administration costs, brokerage costs, payment of duties, and federal inspection services (FIS) staff costs.

The secondary source review included identification, analysis and categorization of cost impacts from a review of some 750 newspaper articles on border issues. These articles appeared in 25 Canadian and 18 U.S. newspapers that were reviewed. Other secondary sources included some 45 border management reports on the overall border crossing environment or on specific border crossings, and several previous studies on the extent of and costs of border transit times. Key reports that were used are summarized in the References. In addition several key secondary sources of data on trade, traffic, tourism, and transit time were used. These key sources included Bureau of Transportation Statistics reports on U.S.-Canada trade by year and month, U.S. Customs Service reports on monthly and annual traffic flows into the U.S., Statistics Canada reports on vehicle traffic entering Canada by year and month, and Canada Customs archives on border primary inspection transit times for commercial and passenger vehicles entering Canada and the U.S.

In addition, in order to gain a better understanding of the nature of various border crossings and to better understand the extent of transit time and uncertainty, a series of site visits to key border crossings were conducted during the summer of 2002 in order to make observations and conduct interviews. The seven key border crossing frontiers at Champlain, NY-Lacolle, Ont (and Vermont crossings); Niagara Falls, Ont.-Niagara Falls, NY (three crossings); Buffalo, NY-Fort Erie, Ont.; Windsor, Ont.-Detroit, MI (two crossings); Port Huron, MI-Sarnia, Ont.; Emerson, MT-Pembina, ND; and Douglas, BC-Blaine, WA (four crossings visited) were visited. Based on these site visits and other sources, a total of 173 personal and/or telephone interviews were conducted in order to assess the impact of border transit time and other border related costs. These interviews were conducted with manufacturer, carrier, broker, trade development, and trade association organizations and are detailed in Appendix II.

PRIOR STUDIES OF BORDER TRANSIT TIME AND COST IMPACTS

While there are no known studies of border-wide transit times since 9/11, there was one pre 9/11 study that examined the extent of primary inspection truck transit times (backup time). This work by Battelle and the Texas Transportation Institute studied four key crossings on the northern border pre 9/11 for

periods of 2-3 days on two separate occasions (Battelle 2002). The researchers studied primary inspection transit times only (secondary inspection yard processing times were not considered), and considered only transit time in excess of typical cycle times at the lowest hourly volume time periods. They reported average inbound (to USA) delay transit times to be 16.0 minutes, and average outbound (to Canada) delay transit times to be 8.1 minutes. Interestingly, they found the fewest delay transit times at the Ambassador Bridge between Detroit and Windsor, the busiest crossing on the border, and the one that has generated the most press reports about long transit times both before and after 9/11. The strength of this study was in the detailed hour by hour analysis of primary delay transit times over a few days, however the weakness is in the very limited number of crossings studied, and the small number of days in the sample. Nor did this study convert the delay transit times into cost impact estimates. There has also been a post 9/11 effort to quantify the cost of transit times and uncertainty on Canadian trucking companies. The study, conducted by KPMG Canada, suggested that the direct costs to the 31 Canadian firms that were surveyed totaled C\$350 million per year (Windsor Task Force 2002, KPMG 2002). These costs were for primary inspection transit times that increased by 20% after 9/11, additional overtime, reduced cycles, and additional equipment needs.

Several newspaper and trade magazine articles and/or reports have also made reference to the “costs of the border” in general but have not been specific about the types of costs they are referring to. One often cited statistic is a pre 9/11 quote from the Canadian Manufacturers and Exporters Association (Trickey 2001) which suggests that the costs of the border result in an average 6% increase in the cost of Canadian manufactured goods, with some industrial sectors facing additional costs of 13% for border crossing delays and regulations. In another pre 9/11 quote, former Prime Minister Brian Mulroney suggested that the “cost of crossing the border is at least C\$30 billion per year to businesses in both countries” (MacDonald 2001). A similar study by the Manufacturers Alliance in the U.S. found that paperwork and inspection costs already add up to 13% to the cost of goods moved across NAFTA borders, and that longer delays since 9/11 are adding another 3% (Mazner 2001). Another estimate of border crossing costs is included in a May, 2002 report to the Canadian Parliament’s Standing Committee on Foreign Affairs and International Trade. This report by Dr. Alfie Morgan for the Windsor Chamber of Commerce estimates that removing remaining tariffs, reducing the needs for inspection at the border, and reducing NAFTA paperwork would reduce costs by some 2-3% of NAFTA trade (Morgan 2002). Finally, according to a study cited by Michael Hart, a Carleton University trade policy analyst, customs clearance and compliance is costing consumers a hidden surtax of 5-7% (Macdonald 2002). However, none of these sources seem to have conducted a detailed review of costs. Instead, most of these quotes on border costs seem to represent rough guesses and do not involve extensive research efforts.

In order to develop a detailed cost analysis the research reported on here sought first to identify the types of border cost impacts that affect the economy, and then to develop high, medium and low estimates of those costs. Interviews, site visits and review of numerous reports identified both macro indicators of border related impacts, and specific categories of actual costs. The following sections review these macro impacts first, and then the detailed cost categories and actual estimates of border cost impacts.

MACRO INDICATORS OF BORDER COSTS AND IMPACTS

Several macro indicators of border related impacts have been identified. These macro indicators relate to the drop-off in traffic levels since 9/11, the relationship of cross-border freight rates to U.S. domestic

rates of an equivalent nature, and the border crossing planning time being assumed by third parties and carriers.

Changes in Border Trade and Traffic

One indicator of the impact the border has, which relates specifically to the events of 9/11, is the level of cross-border Canadian land based exports and traffic to the U.S. As indicated earlier in the paper in Figure 1, cross-border Canadian land based exports to the U.S. in the nine months following 9/11, as compared to the same 9 months pre 9/11, were down 10.8%, despite U.S. industrial production being down by far less, and U.S. auto production actually increasing 4.2%. This decrease in imports to the U.S. may be due to several factors but it clearly is due at least in part to the perceived and actual transit times and uncertainty related to border crossings. This reduced level of Canadian exports to the U.S. has significant impacts not only in Canada, but also in the U.S., where companies are now forgoing productivity benefits that accrued from these imports. These losses in productivity benefits and their cost impact are estimated in the following section on detailed cost impacts.

Another indicator of a border impact from the 9/11 events relates to the reversal of the decade long trend in cross-border truck traffic growth rates since 9/11. As shown in Table 1, between 1984 and 2001, border-wide two way truck traffic grew at an annual rate of 7.2%. Truck traffic into the U.S. alone grew at a similar rate. However, when the nine months post 9/11 are compared to the same 9 month period pre 9/11 the data reveals a 2.2% decline in truck traffic into the U.S. border-wide. While traffic declines were at a slower rate than would be expected by the level of trade fall-off, this decline in truck numbers does represent a significant impact resulting from the border. Interestingly, auto traffic into the U.S. was down by some 14.5% for the same pre and post 9/11 nine month comparison period, mostly by same day travelers. However, because 1 night plus trips with larger per trip expenditures remained unchanged, the level of spending by U.S. and Canadian travelers in each other's countries remained unchanged countrywide (Statistics Canada 2002). None-the-less, border communities such as Niagara Falls, Windsor and Blaine, Washington, which rely extensively on same day travelers, likely suffered significant declines in cross-border expenditures.

Cross-Border Freight Rates

A number of interviews resulted in information indicating that cross-border trucking freight rates are considerably higher than would be the case for similar domestic U.S. moves (Freight Carriers Association of Canada 2002, Overland 2002, Liberty 2002, Holland 2002, Yellow Freight 2002, Reimer Express 2002, and Con-Way 2002, Western Logistics 2002). While there are several reasons for these higher rates, including historical practice and the overall supply demand relationship, interviewees suggested that one of the key reasons relates to border crossing transit times, uncertainty about border crossing times and costs, and the costs of border related administration and information systems support. How much higher are cross-border rates? The Freight Carriers Association of Canada suggested cross-border rates are 10-15% higher than comparable domestic rates. However several carriers indicated their cross-border rates are 20-35% higher than domestic U.S. rates, with the lowest suggested rate premium for cross-border freight being 10%. It is also important to note that several carriers charge a border crossing premium routinely, and/or wait time at the border. For instance, LTL and Roadway subsidiary Reimer Express charges a \$20 per consignment fee for all cross-border freight (Reimer

Express Interview 2002). Con-Way Transportation has an \$8 surcharge (Schulz 2002). These two carriers alone estimate border crossing administration costs of US\$25 million.

Minimum, midrange and maximum estimates of cross-border freight cost penalties are estimated to range from US\$.94 billion to US\$2.35 billion with a midrange estimate of US\$1.59 billion. These estimates start with the value of cross-border trade moving by truck, and assume typical domestic freight rates as a percentage of these trade values equal to 4-5% depending on the scenario. These freight cost percentages are based on published data from Herbert W. Davis and Company (2002). Penalty costs of 10, 15, and 20% on top of these typical domestic freight estimates are then assumed for each of the respective scenarios. Appendix VI addresses these calculations and the rationale in more detail.

Planned Border Crossing Times

Another major macro impact of border transit time and uncertainty relates to the time that shippers, 3PL's, and carriers assume that border crossings will take, regardless of how long it will actually take. Border crossing transit time uncertainty, and the penalties that consignees such as the auto companies and mass merchants charge for deliveries that miss delivery windows, have led both for-hire carriers and private fleet managers to assume a generous amount of time for border crossing activities, regardless of actual experience. This assumed route time, at least for a significant percentage of truck movements is in effect lost time because the operator cannot effectively redeploy the truck if the border crossing time in fact ends up being far faster than assumed. Long before the actual move carriers have made route planning assumptions about the number of stops that can be made by one truck given the assumed border crossing time and have deployed assets and manpower accordingly.

In order to calculate the extent of this planned border crossing time the methodology starts with the number of trucks crossing the border per year, and assumes, depending on the scenario, between 40-60% of these trucks are subject to route planning and are not able to recoup the assumed time even when actual crossings take less time than assumed. Appendix VI details these calculations and elaborates on the issue. The calculations next assume a border crossing time to determine the total number of planned border crossing hours. This assumed time ranges from 1.5 to 2.0 hours based on the typical two hour assumed time that almost all third parties and carriers indicated they assumed (Innovative Logistics 2002, Mercer Trucking 2002). While two hours was the most typical response, several shippers, such as Accucamps Manufacturing (2002) in Canada, and Lamko Plastics (2002), indicated they assume 4-6 hours because of the extremely time sensitive nature of their deliveries. In order to finalize the cost estimates, a cost per hour of US\$150 was assumed. This hourly cost is based on the value used in a recent FHWA report that suggests fully allocated costs for planned transit time range from US\$144-192 per hour (Maring and Lambert 2002 and ICF Consulting 2002). The reader should note that this hourly cost for planned transit time is used throughout the next section which examines detailed cost impacts of the border even though the authors of the referenced papers state that unplanned delay time costs are actually in the range of US\$371 per hour. Based on the US\$150 hourly cost, and the above calculations, the researchers estimated the cost of "planned" border crossing time at US\$1.20 to 2.41 billion with a midrange estimate of US\$2.00 billion.

While these macro indicators suggest the border has a significant impact on costs, the actual categories of detailed border transit time and uncertainty costs, and other border related costs, have not yet been examined. In the following section these detailed costs are identified and estimated.

DETAILED COST ESTIMATES

This section first reviews the categories of cost impacts that were developed following site visits and interviews. The categories are organized into those related to transit time and uncertainty, and those that are of a more general nature. The first subsection also provides a summary of the total costs that have been estimated, with breakdowns by category, and the percent of trade that these costs represent. A second and third subsection reviews the calculation of the detailed costs for each cost category.

Summary of Cost Categories and Overall Impact

As indicated above, two broad categories of costs were identified. These broad categories are transit time and uncertainty related costs, and other more general border related costs. Within each of these categories costs were further subcategorized in terms of whether the cost related to carriers, manufacturers, or FIS. Tables 2 and 3 summarize these cost categories and the detailed cost impact items in each category, and provide a summary of the cost estimates at a minimum, midrange, and maximum level. More detailed discussion and calculation tables for each specific cost impact can be found in Appendix VIII.

Total costs to the U.S. and Canadian economies for the present border management system and trade policies are estimated US\$7.52 to 13.20 billion, with a most likely cost estimate of US\$10.3 billion. These impacts relate to specific costs to carriers and manufacturers resulting from border transit times and uncertainty, other border related costs borne by manufacturers and carriers for duties, broker fees, customs administration, etc., and costs for inspection staffs borne by the two governments. The total costs represent 2.70% of merchandise trade totaling US\$382 billion in 2001. After adjusting out non-truck related costs, the total border costs related to trucking are estimated at US\$9.45 billion at the midrange, or some 4.02% of total truck trade totaling US\$270 billion in 2001. In addition to these quantified costs, the report examines a number of societal impacts of the border related to congestion, environmental issues, truck safety, and the need for immediate investment dollars. These societal costs are detailed in the latter sections of Appendix VIII, Part C.

The transit time and uncertainty related category cost estimates ranged from US\$2.52 to US\$5.27 billion with a midrange estimate of US\$4.01 billion. These costs represent 1.05% of total merchandise trade, and after adjusting out non truck related costs, represent 1.58% of truck borne trade. The other border related cost category of costs were estimated at between US\$4.99 to US\$7.92 billion with a midrange estimate of US\$6.28 billion. At the midrange these costs represent 1.64% of total U.S.-Canada trade, and adjusted to eliminate non-truck related costs, represent 2.44% of total truck borne trade.

Transit Time and Uncertainty Related Costs

Table 2 summarizes the transit time and uncertainty related cost impact categories that were identified during the literature review, site visits, and interviews. The cost categories that are detailed in this section relate specifically to impacts resulting from transit times and uncertainty about transit times, and

affect carriers, manufacturers and personal travelers. These cost categories and their midrange cost estimates are as follows:

Transit Time Uncertainty Related Costs

Carrier Related

Primary Inspection Transit Time	US\$324.2 Million
Secondary Yard Processing Time	755.4
Excess Plan Time (over and above Primary and Secondary Time)	416.4
Reduced Cycle and Other Related Costs	120.7
Driver Documentation/Fax Time	<u>250.7</u>
Carrier Subtotal	1867.4

Manufacturer Related

Manufacturer Lost Sourcing Productivity Benefits	1530.0
Extra Inventory Carrying Costs	<u>458.0</u>
Manufacturer Subtotal	1988.0

Personal Traveler Related	<u>159.0</u>
---------------------------	--------------

Transit Time/Uncertainty Related Subtotal	<u>US\$4014.4 Million</u>
---	---------------------------

Carrier Related Costs

For carriers, the primary source of extended transit time relates to backups at primary inspection stations, and time spent at secondary inspection yards. The primary and secondary times carriers experience are estimated later in this section. These transit times, and uncertainty about the extent of transit time results, as discussed above, in carriers building excess border crossing time into their route planning, and this excess time is often lost time that cannot be productively used. As such the excess time over and above the actual transit time becomes a cost impact that can be estimated. At the same time, when not enough time is assumed for the border crossing, deliveries are late, exchanges at terminals may be missed, and while the research team was not able to quantify these specific late arrival costs, they can be significant. Truckers also experience a number of costs related to the reduced number of cycles they can make in a given day, including the need for additional equipment and drivers to accomplish a set number of deliveries. Carrier drivers also spend considerable time preparing border crossing documentation and faxing documents ahead to brokers. Finally it should also be noted that personal travelers experience extended transit time as well, and these costs are also estimated later in this section. Details on all these costs and their calculations can be found in Appendix VIII, Part A1 .

The actual level of transit time and uncertainty about border crossing times, and more importantly, perceptions of such times by buyers, can have a significant impact on the level of cross-border sourcing, and the level of inventories that supply chain managers feel are necessary to support their operations. Reduced cross-border sourcing that is due to border concerns, leads to foregone productivity benefits that would have otherwise been obtained and imposes a cost on the economy that is estimated later. The impact of additional inventory investments are also estimated later in this section.

Primary Inspection Transit Time Costs

For carriers the total midrange cost impact is estimated at US\$1.867 billion using the hourly truck cost of US\$150 discussed in the last section. Primary inspection booth transit time (backup) costs were estimated to total US\$324.2 million in both directions of travel at the midrange scenario. Table 4 summarizes both primary and secondary costs for each direction of travel for trucks. Secondary yard processing times will be addressed following a discussion of the methodology for estimating primary inspection transit time. The primary inspection transit time costs were estimated by using a comprehensive sample of May 1 to August 30, 2002 daily transit times maintained by Canada Customs (Canada Customs Border Transit Time Archive 2002). This sample has not previously been available to researchers. Canada Customs inspectors at some 20 key crossings estimate and report backup times in each direction for both cars and trucks to a central archive every three hours. The average primary inspection transit times for each of the key crossings in the archive were then used as a representative sample of average primary inspection transit time and multiplied by the post 9/11 annualized traffic at that crossing to arrive at total primary inspection transit hours for that crossing for a one year time period. This procedure was done separately for cars and trucks in each direction of travel for each key crossing and for the total of all other crossings in order to arrive at a border-wide estimate of total transit hours related to primary inspection.

The border-wide primary inspection transit time for trucks is summarized by crossing in Appendix VII. This data includes a summary of the times, and detailed data on each key crossing showing average, minimum and maximum primary inspection transit times for the full summer sample period, and similar information for each of the six measurement points during the day. Data for both entry to the U.S. and entry to Canada is shown in the Appendix. Following are some of the full summer sample, and specific time of day, average primary inspection transit times (backup times) for selected crossings, for both trucks and personal vehicles:

– Detroit Ambassador -	Commercial entering U.S. –	28.82 minutes
– Pacific Highway -	Commercial entering U.S. -	15.09 minutes
– St. Stephen – Calais -	Commercial entering U.S. –	14.04 minutes
– Lacolle – Champlain -	Commercial entering U.S. -	14.20 minutes
– Sarnia Blue Water-	Commercial entering U.S. –	11.69 minutes
– Blaine Peace Arch -	Personal entering U.S. -	22.79 minutes
– Pacific Highway -	Personal entering U.S. -	16.39 minutes
– St. Stephen – Calais -	Personal entering U.S. -	14.05 minutes
– Detroit Ambassador -	Personal entering U.S. -	10.83 minutes
– Blaine Peace Arch -	Personal entering Canada -	10.39 minutes

The following data from the archive shows average primary inspection transit times (backup times) for selected times of day. Again both trucks and personal vehicle data is shown.

- Detroit Ambassador -	Commercial to U.S. 9:00PM - 40.57 minutes
- St. Stephen - Calais -	Commercial to U.S. 3:00PM - 26.12 minutes
- Pacific Highway -	Commercial to U.S. 3:00PM - 23.01 minutes
- Lacolle- Champlain -	Commercial to U.S. 9:00PM - 21.44 minutes
- Blaine Peace Arch -	Personal car to U.S. 6:00PM - 36.68 minutes
- Pacific Highway -	Personal car to U.S. 9:00PM - 27.78 minutes
- St. Stephen - Calais -	Personal car to U.S. 3:00PM - 26.21 minutes
- Detroit Ambassador -	Personal car to U.S. 9:00PM - 16.65 minutes

At the Ambassador Bridge, the busiest commercial traffic entry point in the U.S., commercial primary inspection transit times (backup times) for entering the U.S. averaged 28.82 minutes in the summer of 2002. The worst time of day for entry to the U.S. was at 9:00PM, when the average backup time was 40.57 minutes. However there was a great deal of variability, with backup times on many days reaching 1-2 hours at various times of the day. These primary inspection transit times cause major backups on city streets and have caused an outcry in Windsor, with federal and provincial political leaders making almost weekly pronouncements on efforts to reduce the impact. These Windsor efforts have continued even though the cause of backups is primarily related to the number of available U.S. Customs booths and the staffing of those booths.

Secondary Yard Processing Costs

A second category of carrier transit time relates to time spent in secondary inspection yards for completion of paperwork and occasional inspections. While 10-40% of all trucks, depending on the crossing, direction of travel, and truck type; must enter secondary to visit brokers or to clear paperwork with Customs staff, just some 1% of vehicles are actually physically inspected with some of their contents removed. The costs of these secondary processing times on carriers is estimated at US\$755.4 million at the midrange, with the average truck spending a little over an hour in secondary. See Table 4 for details by direction. In addition, see Appendix VIII, Part A1 for discussion and the calculation data for this cost impact. The secondary yard processing cost estimates are based on dozens of interviews with Customs agencies and carrier management and drivers, and observation at key crossings (Carrier Interviews 2002). The estimates are produced for each individual key crossing and then summed. For each crossing the percent of trucks that enter secondary annually was estimated and multiplied times the annual truck volume to determine the number of trucks that enter secondary in a year. For each crossing a minimum, midrange and maximum scenario of the number of minutes spent in secondary was then estimated based on the referenced interviews. These estimates ranged from 45 to 105 minutes per truck depending on the crossing and scenario. While these times represent the average period in secondary, it is important to note that LTL's with multiple consignments almost all go to secondary, and that 10-20% of the time they may be in secondary for anywhere from 2-10 hours. This variability leads to a great deal of uncertainty.

Excess Route Planning Time Costs

Another major carrier cost relates to route planning times that are typically assumed at 2 hours, even though the actual combined primary/secondary crossing time may be considerably less. None-the-less, this excess planned time is in effect “lost” in many cases, thereby imposing an additional cost on carriers that end up needing more routes, drivers and equipment than would have been the case if actual transit times would have been known. Because a portion of this two hour assumed crossing time cost has already been accounted for in the actual primary and secondary transit time costs discussed above, only the net “excess” time cost is reported here. These unused plan time costs were estimated at US\$416.4 million. This cost was calculated by first assuming that between 40-60% of trucks assume a border crossing time, and then multiplying times an average planned time of 1.5-2.0 hours to arrive at total planned time. The next step was to subtract the actual calculated primary and secondary transit time estimate for each of the three scenarios. The resulting “excess” plan time was then costed out at the hourly rate. Finally, it was further assumed that 35-45% of this excess planned time cost was actually non-recoupable. See Appendix VIII, Part A1 for more discussion and calculation details.

Other Carrier Costs

Two other cost categories for carriers relate to reduced crossing cycles and related costs, and driver time for documentation and faxing of paperwork to brokers. For reduced cycles and related costs, the calculation assumed, depending on the scenario, that between 7-12% of truck freight billings at domestic like rates incurred these kinds of costs. The midrange estimate for these costs was US\$120.7 million. Reduced cycle costs occur because carriers cannot make as many moves across the border as they would be able to absent the border. Other costs relate to driver-out-of-service costs, missing exchanges, warehousing costs for missed deliveries, etc. The calculation assumed, depending on the scenario, that a freight cost penalty of 10-14% would be incurred for these types of costs. A final carrier cost related to transit time and uncertainty is the time involved in preparing documentation and faxing paperwork to brokers. This cost was estimated at US\$250.7 million at the midrange. The documentation relates to preparation of manifests and other customs paperwork, and the need to fax paperwork ahead in order to avoid the need to enter secondary yards. A far greater percentage of shippers and carriers are trying to use customs systems such as Canada’s Pre-Arrival Review System (PARS) and the U.S.’s Pre-Arrival Processing System (PAPS) that allow for clearance at primary given the uncertainty over time it will take to get into and out of secondary customs and broker offices. Depending again on the scenario, it was assumed that between 20-30% of truck movements incurred these kinds of expenses. It was further assumed that a driver time commitment of between 20 to 40 minutes, depending on the scenario, was required. Again, Appendix VIII, Part A1 contains a detailed discussion of each of these cost categories, and material on the cost calculations.

Manufacturer Related Costs

Manufacturer cost impacts that result from uncertainty in the border crossing time were estimated to range from US\$1.24 to US\$2.69 billion with a midrange estimate of US\$1.99 billion. Two cost impacts were estimated – for lost productivity and for higher inventory carrying costs.

The first of these impacts is for manufacturers who suffer reductions in productivity because of reduced sourcing from Canada. Appendix VIII, Part A2 provides additional discussion on the rationale behind

the calculation approach. Lost productivity benefits are estimated at US\$1.53 billion at the midrange for a 12 month year. The calculation is based first on the annualized declines in Canadian sourcing observed in the first nine months following 9/11, less the reduction that would be expected as a result of lower U.S industrial production. This net reduction was then multiplied by a lost productivity factor of between 7-13%, and an average 10%, depending on the scenario, to arrive at the overall loss in productivity resulting from less Canadian sourcing. These reductions in Canadian sourcing are thought to be at least in part due to buyer perceptions about the level of border transit times and uncertainty on the border now, and perhaps also reflect buyer concerns with possible levels of transit time and uncertainty in the future. Reduced sourcing may also be due to concerns about greater U.S. Customs scrutiny of paperwork and perceptions about possible upcoming requirements for greater security documentation.

The second category of manufacturer impact relates to higher cross-border supply chain inventory levels and the resulting increase in inventory carrying costs (ICC), and was estimated at US\$458.0 million. This calculation begins with overall U.S.-Canada trade and calculates what 1 day of inventory would represent. The three scenarios then assume an extra 2, 4 or 6 days of inventory supply to deal with cross-border uncertainty. An 18% ICC is then assumed to obtain the dollar ICC impact. The extra days supply estimate is based on many interviewees (Carrier and 3PL Interviews 2202, Manufacturer Interviews 2002) suggesting that small increments of additional inventory have been added to the supply chain. In addition, several articles that were reviewed suggested that additional inventory would be a prudent step for manufacturers to take to protect their cross-border supply chains from disruption due to crossing time variability (Strong 2001, Strong 2002, Cooke 2002). Examples of extra inventory related to a produce supplier that had to add 12 hours supply or C\$350,000 per year because of the need to load trucks the night before instead of the morning of delivery, to auto suppliers that increased their lead times by some 2 hours (Masstranarti 2002, Anonymous 3PL's 2002). While these increases in ICC are fairly minimal, and nowhere near what some were predicting immediately following 9/11, the research team none-the-less believed that there were indeed some penalty ICC costs incurred due to border uncertainty. See Appendix VIII, Part A2 for discussion and calculation details.

The final cost category is for primary transit times for personal travelers and is estimated at US\$159.0 million. See Appendix VIII, Part B for details of these costs and calculation approaches.

Other Border Related Costs

Table 3 summarizes the costs for the other border related category. These costs include those for impacts related to customs administration, brokerage costs, duties, etc., and affect carriers and manufacturers. In addition, federal inspection services (FIS) staff costs are also included in this section. Following is a summary of the cost categories and mid-range cost estimate for each:

Other Border Related Costs

Carrier Related

General Border Administration	US\$200.0 Million
Transportation Cabotage Regulations	<u>150.0</u>
Carrier Subtotal	350.0

Manufacturer Related

Brokerage Costs	462.9
Border Duties, Fines and Fees	1605.1
Customs Administration	<u>3290.0</u>
Manufacturer Subtotal	5358.0
Federal Inspection Services Staff	<u>571.5</u>
Other Border Related Costs Subtotal	<u>US\$6279.5</u> Million

The other border related costs include those related to compliance with trade policies, and administration of trade and immigration policies by the government. These costs are estimated to range from US\$4993.3 to US\$7919.4 million with a most likely midrange estimate of US\$6279.5 million.

Carrier Related Costs

The carrier related costs that were estimated relate to compliance with customs administration requirements, and compliance with continuing cabotage restrictions. Appendix VIII, Part D1 includes material on each of these costs and the calculation approach. Total carrier costs were estimated at US\$350 million. Carrier customs administration costs were estimated at US\$200 million and relate to headquarters planning and oversight, staff and expenditures for management information systems support, headquarters staff for processing customs paperwork, field staff at border crossings to facilitate driver transit, and dispatcher time for resolving border related delays and developing work around fixes (Carrier Interviews 2002). One example of such costs includes the US\$15-20 million spent by Con-Way Transportation to implement new border security related requirements alone (Schultz 2002). Another example includes the local agents that carriers like Overland and Reimer Express keep in place at major border crossings in order to help their drivers (Carrier Interviews 2002). Many carriers also reported they have large border processing centers staffed with employees that work to facilitate crossings and process paperwork related to various clearance programs such as PARS or PAPS.

A second category of carrier costs relates to cabotage restrictions that Canadian carriers face when operating in the U.S. Specifically, U.S. immigration and customs rules continue to make it difficult for Canadian drivers to make point to point moves wholly within the U.S (FMCSA 2002, Barnes 1998, Barrett 1998). While cross-border moves into the U.S. are legal, and cross-border loaded moves back to Canada are legal, the Canadian driver cannot be used to make a move wholly within the U.S. except under certain conditions. Nor can the Canadian driver solicit for loads back to Canada while in the U.S. – any return load must be pre-arranged. These restrictions have had an effect on drop and hook operations, repositioning moves in the U.S. (allowed by Customs but not INS so not allowed), and have even had the effect of making cross-border intermodal operations more difficult. For instance a driver cannot reposition an empty trailer unless he/she entered with or departs with the trailer.

The costs are estimated to range from US\$100.0 to US\$333.3 million, with a most likely estimate of US\$150.0 million. One large Canadian LTL estimated that Canadian carriers have cabotage costs of US\$333.3 million, and this estimate formed the upper limit of our cost range (Carrier Interviews 2002). This carrier indicated they themselves had costs of US\$100 thousand for one customer alone. Several carriers also explained how the rules prohibit them from making repositioning moves away from the border that would give them an opportunity to obtain a return load to Canada. As a result they return empty at a considerable cost penalty. In another case a manufacturer in Canada reported on how they sometimes have to hire for-hire U.S. carriers in the U.S., when their private fleet could have made movements of their product in the U.S. in conjunction with movements they had to make anyway in order to pick up a return load to Canada (Lamko Manufacturing Interview 2002). One last example relates to how cabotage restrictions have complicated Canadian Pacific's Xpressway Service from Montreal and Toronto to Detroit (Canadian Pacific Interview 2002). For hire trucking companies that have placed their trailers on the train for delivery to Detroit have sought to use their Windsor, Ontario terminal equipment and drivers to pick up these trailers and complete the delivery to say Lansing, Michigan. However, because U.S. INS considers the move from Detroit to Lansing to be a domestic one, rather than a continuation of an international move from Toronto, the use of Canadian drivers constitutes a cabotage violation. See Appendix VIII, Part D1 for details.

Manufacturer Related Costs

Manufacturer related costs are estimated at US\$4340.4 to 6375.2 million with a most likely estimate of US\$5358.0 million. These costs relate to brokerage fees, border duties and fees, and customs administration. Detailed information on each of these cost categories, and calculation details, can be found in Appendix VIII, Part D2.

Brokerage costs are estimated to total US\$462.9 million for entries to each country on goods originating in the other. While it proved impossible to develop estimates of these costs from brokerage associations, interviews with individual brokers allowed for a rough estimate of likely costs (Broker Interviews 2002, Trade Association Interviews 2002). The calculation approach was to estimate the number of entries to each country based on information from customs agencies, and then to estimate an average cost per entry based on indications from a number of brokers. See Appendix VIII, Part D2 for details.

Despite NAFTA and the earlier U.S.-Canada Free Trade Agreement, there is still a significant dollar value of duties paid to the two governments by firms in the other country. These duties are often for goods that are non-NAFTA conforming and therefore not eligible for NAFTA duty treatment. Alternatively, it is not at all uncommon for firms to simply pay the non-NAFTA duty in order to avoid the complexities of completing paperwork on rules of origin (Broker Interviews 2002). In addition, there are many goods that are subject to dumping or countervailing duties. There also are a variety of fees that must be paid, and occasional fines for non-compliance.

Efforts to quantify the level of these duties proved to be very difficult. Repeated requests to a variety of government agencies in each country for information on the level of duty payments proved unsuccessful (Duty Related Interviews With Government Agencies 2002, Broker Interviews 2002, Trade Association Interviews 2002). As such, an estimate of the level of duties had to be calculated. For entry to the U.S., this estimate was based on data provided by U.S. Customs on the level of 2002 duty collected at northern ports – for imports from all countries by all modes including air (U.S. Customs 2002). This value of US\$366.9 million was reduced by an estimated amount in each scenario to reflect our best

judgment of the percent of this total that would relate to Canadian imports. These estimates ranged from US\$200-300 million. In addition, an estimate of new softwood lumber duties was made given new countervailing and dumping duties. This duty was assumed to apply to 50-70% of imported softwood lumber, at the 27% rate (P-I News Wire 2002). Additional negligible costs for fines were added given data received from U.S. Customs (U.S. Customs 2002). Finally an estimate of truck fees for entering the U.S. was calculated. The calculation of duties for entry to Canada was based on information received from Canada Customs indicating that C\$2.9 billion was collected in total from all source countries. Given this information, it was assumed that the duties related to imports from the U.S. ranged from US\$300-400 million. The above calculations resulted in a midrange estimate of total duty payments equaling US\$1605.1 million. See Appendix VIII, Part D2 for details.

A third category of manufacturer costs relates to administration of customs requirements on trade between Canada and the U.S. These costs, which include both Canadian and U.S. manufacturers and other importer/exporters such as retailers, were estimated to range from US\$2.63 to 3.95 billion with a most likely estimate at the midrange of US\$3.29 billion. These costs are for both in-house and outsourced services related to customs administration, and for management information systems (MIS) support of the customs administration process. Specific activities relate to administration and support of functions such as planning for participation in various customs security/trade expediting programs, preparation of customs paperwork, oversight of brokers, day to day efforts to rectify customs related problems, and MIS support activities to allow for real time integration and communications between FIS, brokers, suppliers and customers. In order to calculate these costs it was assumed that large and firms have somewhat different profiles. For the top 100 firms, that account for some 30% of all U.S.-Canada trade (Macdonald 2001), it was assumed that each firm spends between US\$5-10 million on customs administration, or .4-.9% of sales (Manufacturer Interviews 2002, Broker Interviews 2002). For smaller firms that account for the bulk of trade flows, it was assumed that .8-1.1% of sales was spent on customs administration (Manufacturer Interviews 2002, Broker Interviews). At the midrange these costs total US\$3.29 billion. See Appendix VIII, Part D2 for details of these calculations. It should be noted that these costs are expected to increase significantly if proposed advance notices of 4-24 hours are required before goods arrive at the border, and/or if very detailed identification of goods is required on paperwork.

Federal Inspection Services Staff Costs

A final category of costs relates to the amount spent by federal governments for Customs and Immigration staff. While there are other types of federal inspections services (FIS) agencies, this analysis is limited to these functions, and is further limited to only inspector staff costs and does not include other support expenditures. The calculation approach was to first estimate the number of Canadian and U.S. staff under each of the three scenarios. For the minimum level, existing staff levels were used. For the midrange estimate, appropriated staff levels were used, and for the upper end scenario authorized staff levels were used (FIS Staff Levels 2002). The cost of each staff person was estimated at US\$100,000 on the U.S. side, and at US\$80,000 on the Canadian side. The resulting estimate is that FIS costs are in the range of US\$452.9 million to US\$960.9 million, with a midrange estimate of US\$571.5 million. See Appendix VIII, Part E.

CAUSES OF LONG TRANSIT TIMES/UNCERTAINTY AND POSSIBLE SOLUTIONS

This section first examines the causes of long transit times and uncertainty. The second subsection then discusses some possible short/medium term and long term approaches to reducing transit times and uncertainty.

Causes of Long Transit Times And Uncertainty

From a supply chain management logistics perspective, the biggest issue on the U.S. – Canada border is uncertainty over the amount of time required to complete a crossing, and the costs of complying with customs and immigration regulations and security provisions. In terms of transit times, the speed of crossing is important, however, far more important is a reduction in uncertainty over crossing times. The level of certainty is critical because whatever the crossing time, logistics planners can design a system that will operate effectively. Inventory planning and carrier route planning is based on crossing times that are consistent and that can be relied upon. Uncertainty causes planners to build in excess capacity, inventory and crossing time that has a cost. More importantly, it may cause commercial buyers to be cautious about sourcing goods cross-border, depriving their companies of potential productivity enhancing benefits (The Windsor Star 2003). When the actual crossing time exceeds the planned time, delivery commitments are affected, truck and driver schedules are disrupted, returnable containers may end up out of position, assembly plants can run out of inventory, and management time must be spent on corrective actions to get trucks and drivers repositioned. As such, it is critical that a level of certainty be brought to the entire border crossing process.

Specific Causes

Each border crossing, and the border crossing process, is in effect a small system comprised of several components. The system is only as good as its weakest link. As such, the various components of the system must be examined to determine their impact on total crossing time, and their impact on the degree of uncertainty. The components of the crossing include those related to both primary inspection transit, and those related to secondary processing. The key components or processes in the crossing system include those related to:

- Ingress road speed and reliability
- Toll booth processing capacity
- FIS exit check capacity
- Crossing roadbed capacity
- Primary inspection processing time capacity and plaza size
- Secondary yard diversion rates and processing capacity
- Broker processing capacity
- Preparation of documents and drivers
- Egress road speed and reliability

A failure or slowdown in any of these components of a crossing can cause long transit times and/or variations in the normal crossing time. This study, along with prior research the authors have been involved with, allows for some conclusions to be drawn about the parts of the system that can cause problems. While each crossing is unique, and it is difficult to generalize, we believe the following are key causes of longer transit times and uncertainty:

- **Ingress Roads** – Narrow 2 lane or even single lane access roads and traffic lights are not uncommon and can cause significant delay and congestion on local streets. Windsor, Ontario tunnel access at Goyeau St. is an example, as is Niagara Falls, Ontario access to the Rainbow Bridge, or access to the downtown St. Stephens-Calais crossing. Southbound and northbound I75/96 access to the Ambassador Bridge in Detroit is also an issue. Limited access road capacity and toll plaza areas can result in severe congestion on local roads in a few cases such as at the Detroit-Windsor tunnel. This problem is more severe when vehicles are being held out of the tunnel due to primary inspection backups. The resulting queues on local Windsor streets cause a great deal of congestion, delays to local non-border related traffic, and numerous incidents of road rage. Windsor police often had three to four officers stationed at the tunnel plaza access to direct and control traffic during the summer of 2002. Limited space makes correcting most of these access issues at existing crossings difficult at best. Of course the underlying cause of these kinds of problems continues to be primary inspection backups.
- **Toll Booths** – there have been some incidences of backups from toll booths. At the Ambassador Bridge, where truck toll booths are located on the U.S. side of U.S. primary inspection, trucks have been observed to occasionally backup into the inspection areas. This is not common however. Another example is at the Windsor tunnel toll booths where traffic quickly backs up onto Goyeau St.. Toll backups are typically due to efforts to hold traffic from going into the tunnel when it is backed up from U.S. primary.
- **U.S. Exit Checks** – A new phenomena which has caused some backups are the exit checks that have been going on at the Peace Bridge and Niagara Falls Bridge Authority throughout 2002 (The Buffalo News 2002). These crossings are the only ones on the northern border where permanent exit checks are occurring on a regular basis. These exit checks for cars and trucks have caused backups of traffic and increases in transit times occasionally, particularly in the case of trucks at the Lewiston-Queenston Bridge. In addition to actual backups, the checkpoints, located immediately in front of toll booths, require automobiles to merge down from as many as 10 or so toll booth lanes to two to four exit check booth lanes in a matter of a few feet. This causes a great deal of jockeying about and opportunities for road rage and minor accidents.
- **Crossing Roadbed Capacity** – Roadbed capacity is not typically a cause of transit time/uncertainty. Even the busiest crossings such as the Ambassador Bridge have ample bridge roadbed capacity. The Ambassador is at just 58% of capacity according to the company representatives. However, any activity that removes one lane from service, such as even an hours worth of construction, can lead to immediate backups due to insufficient capacity. Perhaps the biggest roadbed capacity issue is at Calais – St. Stephen where the downtown crossing has very limited capacity. The single directional lane Detroit-Windsor Tunnel is one of the few single directional lane crossings but is not thought to have a roadbed capacity problem currently. Generally, roadbed capacity is one of the least important factors in causing backups.

- Primary Inspection Booths - Interviews and observations confirm what has long been the case, that the number of open primary inspection booths continues to be the most important issue in determining the number of backup incidents, the severity of each incident in terms of backup times, and how long a given incident lasts. Specific issues relate to:
 - Number of Booths Available - In several locations the number of primary inspection booths is an issue, such as was the case at the Ambassador Bridge U.S. truck primary inspection station until an additional three booths (50% increase in capacity) were added this summer. While these booths have not been formally accepted by GSA, and may not meet all size and design requirements, they offer the opportunity to substantially eliminate truck backups from primary. Such truck backups into Windsor are by far and away the single largest cause of extended transit times anywhere on the northern border. The number of primary inspection booths is also a major issue at Port Huron for truck entry, and is an issue at times at several other crossings.
 - Staffing of Available Booths - While the U.S. has generally done a better job of staffing available booths than has been the case for many years, many backup incidents still occur when not all available booths are staffed. The length of time it takes to wind backup incidents down is also highly dependent on the response time for FIS to open additional booths. More significant backup incidents occur when time elapses before additional booths can be opened. During this project the research team observed numerous backup incidents of a half hour plus when far fewer than the total available booths were open. Other observers, such as Jim Philips of the CanAm Border Trade Alliance, have suggested that pre 9/11, half of all booths were closed at any point in time (Toulin 2002). This was repeatedly the case at the Peace Arch while observations occurred, and at the Detroit-Windsor Tunnel. Lack of staff prevents opening additional booths.
 - The other major variable affecting primary backups is the processing time per vehicle cycle. While this time had averaged 25 seconds for cars and 48 seconds for trucks pre 9/11, it now appears to average 35 seconds for cars and 70 seconds for trucks given many observations by the research team. These times have been necessary for security purposes since 9/11. Of course this relatively minor appearing change in processing cycle time per vehicle has a major impact on primary capacity. Any increases in processing times, which occurs frequently, leads to additional backups if there is significant vehicle volume.
 - A final issue related to primary is the occasional FIS inspections of trucks right in front of primary inspection booths thereby effectively closing a booth for 5-10 minutes. While these inspections sometimes occur off to the side where there is more room, these inspections were observed several times and they cause additional delays and congestion.
 - More significant backup incidents occur when time elapses before additional booths can be opened. During this project the research team observed numerous backup incidents of a half hour plus when far fewer than the total available booths were open. During many of these incidents no additional booths were opened. This was repeatedly the case at the Peace Arch while observations occurred, and at the Detroit-Windsor Tunnel. Lack of staff prevents opening additional booths.
- Secondary Yard Processing Inspection Areas – Secondary inspection space continues to be a problem at several crossings on the U.S. side. This is true at Calais, at the Peace Bridge (where there are severe space limitations), sometimes at the Ambassador Bridge (where we have occasionally observed the lot full when X-Ray operations were underway), at the Blue Water

Bridge where the U.S. plaza has insufficient space and additional on-site parking spaces have an extremely high cost, and every so often on the Canadian side of the Pac Highway crossing where U.S. bound trucks park in Canada prior to walking across into the U.S. to visit U.S. brokers.

- The fact that secondary broker facilities are sometimes some distance from the truck parking areas also adds to costs. This is the case at the Canadian secondary yard for the Ambassador Bridge where brokers are spread out over .25-.50 miles and drivers must walk to these locations, and at Pac Highway for U.S. entry where drivers must walk across the border to reach brokers.
 - Auto secondary did not appear to be a problem this summer, however, any significant referrals to secondary for planned exit visa control and/or fingerprinting of certain nationals would overwhelm all crossing's U.S. auto secondary yard capacity.
 - Secondary processing times can also be significantly affected by the level of FIS staff available to staff secondary windows and physical inspection areas. Significant lineups of drivers have been observed, along with drivers waiting for paperwork to be processed. The level of staff dedicated to secondary is difficult for outsiders to observe but it often does not appear to be sufficient to process the volume of drivers present in a timely way. These limitations are due to a lack of staff.
- Customs Processes/Broker Operations/Documentation Preparedness – A major cause of longer transit times relates to ongoing referrals to truck secondary on both sides. LTL carriers or others with more than three-five consignments per truck are routinely referred to secondary even if pre-clearance processes have been used. Entry to secondary for these “trap loads” leads to significant transit time increases for carriers. Programs such as the U.S. NCAP are designed to eliminate the need for entry to secondary, however, despite being much promoted as the “technology” solution to border crossings, the rate of acceptance for this program and the successor FAST program, remain unclear. It is not uncommon to see lines of 20-30 drivers waiting inside Customs buildings for access to the Customs clerical worker accepting paperwork.
 - Other causes of backups relate to:
 - Broker Hours – Broker hours can be an issue at some crossings, and even if brokers are open, if qualified personnel are not available at night or on weekends when many LTL carriers cross, this can lead to additional processing time.
 - Incomplete Pre-Clearance Work - Even longer secondary processing time occurs when pre-clearance work has not been completed by brokers and drivers arrive at primary, or even worse, when there are problems with processing of entries. Additional processing time occurs when trucks are referred to secondary for actual inspection by FIS.
 - Unprepared Carriers/Drivers – There are still many small carriers that do not participate in pre-clearance programs such as PAPS for entry to the U.S. and PARS for entry to Canada. There also are many shippers/importers that do not participate in programs such as “line release,” even though they may be able to do so. These unprepared carriers cause considerable problems at crowded secondary yards and have led to pre-processing centers at the Peace Bridge for U.S. entry and an additional facility being considered for Sarnia and Windsor.
 - Importer Documentation Approaches – One cause of the large number of “trap loads,” and the need for large number of vehicles to enter secondary, is the fact that, for internal management accounting and documentation purposes, many large importers treat

multiple supplier shipments on a truck as separate entries, even though the importer could opt to treat all the consignments as a single entry. This results in more than 3 entries on the truck and a trap load condition. A major auto company and a broker, both of whom wanted to remain anonymous, indicated this is common so as to be able to track duties and other costs by vehicle and assembly plant.

Anatomy of a Backup

One of the keys to reducing backups and uncertainty is a quick response to backup incidents by FIS personnel. Once backups start, a certain “snowballing” effect takes place, congestion increases, and it often takes considerable time to wind a backup down. The following example of a backup incident from U.S. primary inspection examines the anatomy of a slowdown and provides insight into the speed with which problems can occur (the operator of the crossing asked that they not be identified):

- 7:30AM - No car or truck queues.
- 7:51AM – Breakdown in truck lane reducing available booths from 3 to 2.
- 7:45AM – Truck traffic increases from 63 per 15 minute interval to 85 per minute.
- 8:00AM – Trucks back up some 1000 feet
- 8:12AM- A third booth is opened but trucks are already backed up 5000 feet.
- 8:18AM - Fourth booth is opened. Trucks are backed up 7500 feet.

In just 27 minutes trucks backed up 7500 feet or about 75 trucks deep even though additional booths were opened up relatively quickly. With traffic control measures, trucks are held at this particular crossing, making the queue look fairly modest from the U.S. customs plaza, but diverting the backup to local streets. While this queue took just 27 minutes to develop it took until 2:00PM to clear with U.S. Customs maintaining 4 open booths. The lesson is that queues can develop very quickly, and take a long time to control.

Possible Short/Medium and Long Term Solutions

The causes of long transit times and uncertainty over crossing times are complex and solutions will require a multifaceted approach involving Department/Ministry’s of Transportation, FIS agencies, brokers, carriers and shipper/importers. Solutions also require considerable cooperation across the border between Canada and the U.S. given the fact that the problems that manifest themselves in one country are often due to problems caused, and that must be resolved in, the other country. For instance, the longest backups on the border, causing the most congestion and problems for the local community, are in Windsor. However, the primary cause of these problems is in Detroit, where there are a combination of problems relating to the number of FIS booths for trucks, and the FIS staffing of available booths. While Canada and Ontario would like to solve the problems for Windsor residents, the root cause of the problem, and the real solution, lie in the U.S.

Short to Medium Term Solutions

Short to medium term solutions revolve around FIS staff levels increases and the effective utilization of that staff, increases in FIS plaza acreage and the number of primary inspection booths, an end to FIS

policies requiring “trap loads” to routinely enter secondary once sufficient primary inspection booths are in place, improvements in ingress/egress roads, creation of off-site second stage inspection facilities, improvements in broker capacity and relationships with drivers, implementation of increased monitoring of crossings with cameras and communication of information, greater participation by carriers and their customers in various pre-clearance programs and possible requirements that carriers participate in programs allowing for routine loads to be cleared at primary, implementation of licensing programs for border carriers/drivers that would be required for border crossing privileges, and implementation of frequent traveler programs in an effective way. Each of these points is briefly discussed in the following points:

- FIS Staff Levels and Effective Utilization – Increases in FIS staff levels are critical given the longer processing times per vehicle that have occurred since 9/11, given additional planned security enhancements such as those requiring advance notice of goods arriving at the border, and given likely future increases in traffic to pre 9/11 levels or beyond. The process of increasing FIS staff levels is underway and will make a large contribution to reducing transit times and uncertainty. However, it will be critical that these personnel be deployed in a way that allows for quick increases in the number of open primary inspection booths as traffic levels dictate. It will also be important that staff levels be adjusted rapidly in truck secondary inspection yards so as to avoid long waits in these facilities.
- End to routine requirements for “trap loads” to routinely enter secondary - Once sufficient primary inspection booths are in place, FIS organizations in both countries should develop policies that will end the practice of requiring trucks with more than 3-5 consignments to enter secondary, even when they and/or their shipper/consignees are participating in programs that would otherwise allow for clearance at primary. Currently, most LTL trucks are required to enter secondary. Secure LTL’s, hauling approved shippers and importer’s goods, should be able to clear without entering secondary.
- Expansion of plazas - A medium term solution, and one which will be difficult to implement at many crossings given a lack of space, involves the expansion of FIS plazas so that they can accommodate more auto and truck inspection booths for inbound checks, outbound exit checks which might be required at more crossings in the future, secondary space for both autos and trucks, and dedicated approach lanes for frequent traveler and secure cargo programs. Where space permits, additional inspection booths should be put into place immediately.
- Ingress/egress road improvements - At several crossings, improvements in ingress/egress roads are necessary. These improvements may or may not be feasible given surrounding infrastructure, however, where possible, crossings should be linked directly to major interstates or other primary roadways. Access/egress ramps to plazas should also be upgraded from one to two lanes or beyond wherever possible. Wherever possible, traffic lights should be eliminated from key roadways, and grade separations should be put into place at key cross streets.
- Off-site second stage inspection facilities - Where plazas cannot be expanded sufficiently, off-site second stage inspection facilities should be considered. These facilities could be used for more detailed processing of entry/exit checks on foreign nationals, and for detailed inspection of truck cargos. Roadways between first stage primary/secondary plazas and these second stage facilities could be monitored with cameras and other measures.

- While controversial, serious consideration should also be given to off-site first stage secondary inspection yards, to joint U.S.-Canada facilities, and reverse inspections. There already is precedent for off-site secondary in Canada, such as at the Ambassador Bridge in Windsor where the off-site truck secondary is some 2 miles from the border. There also is precedent on the U.S. side for off-site secondary. For instance, at the Windsor-Detroit Tunnel, truck secondary is located some 2 miles away at the Ambassador Bridge. Joint facilities, and reverse inspections, await Canadian legislation that would allow U.S. FIS to operate in Canada on acceptable terms. The U.S. already has legislation that would allow Canadian officers to operate in the U.S. (Coalition for Secure and Trade Efficient Borders 2001).
- Broker capacity and driver relationships - A major cause of uncertainty relates to processing times for brokers at secondary yards, and the availability of broker key personnel during weekends and nighttime hours. Measures must be taken to assure that brokers provided access to scarce on-plaza facilities are sufficiently staffed to avoid routine waits for drivers, that they have sufficient expertise on site to resolve problems in a timely manner, and that they clear PARS and PAPS loads on a priority basis before drivers arrive at a crossing. In addition, crossing operators should be required to provide broker space immediately adjacent to secondary yards, limiting the walking distance required for drivers. Finally, programs need to be developed to improve communications between drivers and brokers, and to improve the working relationship between drivers and broker personnel.
- Crossing monitoring processes - A relatively inexpensive step that can be taken is to better monitor crossing and ingress/egress road conditions with camera technology. Central control room monitoring of images would allow for police traffic control personnel to be dispatched more rapidly when needed, and would help FIS better understand the extent of backups and congestion being caused by lineups at their primary inspection booths. FIS could then increase the number of open booths in a more timely manner before long backups are established.
- Carrier/Shipper/Consignee participation in “pre-clearance” programs - Many carriers and shipper/consignees do not currently participate in programs allowing for clearance at the border, such as carrier PARS and PAPS programs, other traditional “pre-clearance” programs, or newer programs such as C-TPAT or CSA, and FAST, that attempt to provide for expedited clearance of safe and secure loads. One approach is to begin requiring participation so as to assure that a smaller number of trucks must enter secondary. These latter programs try in effect to separate high risk and low risk traffic, but while touted as providing dedicated lanes for participants, at some locations it is not possible to get to the dedicated lanes on the plaza without waiting in line with all carriers on approach roads, bridges or tunnels. Operators could also require that carriers using their facility are on the PAPS and PARS programs before they can use the crossing, an option being considered at the Peace Bridge.
- The U.S. and Canada should also end immigration policies that result in entry being prohibited for those with minor misdemeanor or low class felonies. These restrictions complicate processing and really do not serve a major security interest. They also reduce the pool of available drivers for cross-border operations, leading to higher costs and less safety because less experienced drivers are hired in their place. Testimony before the Canadian Parliament’s Committee on Citizenship and Immigration (2001) indicated that 18% of U.S. drivers were not technically legal in Canada because of these rules.

- Special licensing of border carriers - Authorities could also establish requirements for carriers/drivers to be given border crossing privileges, thereby eliminating many of the smaller untrained carriers or private operators, and untrained drivers that slow the border crossing process for many, and that lead to more congestion at crossings. Such an approach might resolve major problems with untrained carriers and drivers.
- Frequent traveler programs - Frequent traveler programs have the potential to secure and frequent personal travelers across the border. Programs such as NEXUS should be activated at as many locations as possible as soon as possible. However, such programs can only be effective if plazas are big enough to give these preferred travelers easy access to inspection booths dedicated to them. At many crossings this will not be feasible unless bridges are widened and/or access roads are widened so as to provide dedicated lanes to approach the dedicated booth without waiting in line with other non-participants..

Long Term Solutions

Long term, there are two approaches to dealing with the U.S.-Canada border. One approach is to invest in sufficient new border crossings, staff and technology (Audi 2002) to facilitate trade and maintain border security. The focal point of such an approach would be a tightening of security on the U.S.-Canada border. This approach would require upwards of several billions of dollars for facilities, and ongoing FIS staff needs. While these investments could help facilitate trade, there is some question about the degree of security that can be provided on a border between two countries with this level of economic integration and cross-border trade and transportation.

Pre 9/11 many commentators indicated there was very little security on that border. For instance, pre 9/11, U.S. Ambassador to Canada Paul Cellucci was quoted as stating that, in terms of providing security on the internal border, “It’s kind of a needle in the haystack approach to think we’re going to stop these [bad] guys at the border” (Trickey 2001). Many others have commented on the difficulty of catching individuals on the border. Hart and Dymond (2002) note that “serious criminals have ample opportunity to cross the border by by-passing ports of entry with controls. A U.S. Coast Guard Commander conducting a pre 9/11 study on border security for the Council on Foreign Relations was quoted as saying that “most border control systems on the U.S.-Canada border don’t pass the giggle test (Handelman 2001). It should be noted that much of the border is essentially unguarded. Immediately after 9/11 U.S. Senator Byron Dorgan commented that “The only thing stopping potential terrorists from entering the U.S. from Canada after 10:00PM at 15 of 18 border checkpoints in his home state is an orange road pylon.” (Dawson 2001). Since then there have continued to be a number of reports questioning the level of security on the border (GSA 2003, Fox News 2002, MSNBC 2002, Audi, 2002, Detroit News Staff 2002).

Whether or not new security spending on the border, including remote monitoring systems, could truly boost security on the border is an open question. However, efforts to increase security, including various new controls on travel by non-nationals, and requirements for various advance notices of freight movements, could impede commerce regardless of the level of investment in facilities and staff at key guarded crossings. While technology is often cited as a solution that will allow for both security and free flows, it is not a given that high tech can deliver both.

A second alternative that has gained considerable attention in Canada is the concept of an “external perimeter” approach to the border between the U.S. and Canada. Such an approach would not involve a sudden movement to a new system but would instead represent movement along a continuum towards a more open border. The most advanced version of this approach would result in border inspections being conducted on the U.S. and Canada’s external borders, with a change in emphasis on the internal border to one of random inspections and post audits with severe penalties for violations of each countries laws and/or trade policies. Such a system would of course require Canada to more closely integrate its immigration policies with those of the United States, including those related to asylum and visa waiver rules. Many other policies, although not all, would have to be more closely integrated, including those related to agriculture, food safety, health controls, etc. The external perimeter approach would also provide additional incentives for the U.S. and Canada to integrate trade business travel policies. The benefit from such an approach would be potential elimination of most of the US\$10.3 billion in cost impacts from the current system, a savings equal to 2.70% of the value of all current merchandise trade. Some have also suggested that such an approach could provide for additional security by focusing on the external border where more thorough inspections are possible, and by focusing on more effective intelligence-directed and random inspections (Canadian Parliament Standing Committee on Citizenship and Immigration 2001, Trickey 2001, Hart and Dymond 2002, Handelman 2001).

AN EXAMINATION OF THE “EXTERNAL PERIMETER” BORDER MANAGEMENT STRATEGY

The border management system in place today results in periodic backups, some uncertainty about the extent of transit times, and many other general border related costs such as those associated with customs administration. As described above, there is also some question about the ability to provide meaningful security on the border. Is there perhaps an alternative approach that would help to eliminate the cost impacts described above, while providing for similar or even better security than is provided by the current system?

One of the key options is the “external perimeter” strategy described above in the long term solutions section. Such a strategy would, over time, replace the current border management system with what some have argued would be more effective external border checks at the perimeter while reducing controls at the U.S.-Canada border. Routine checks would be replaced with random and intelligence based inspections. This strategy would place the emphasis on border security at the U.S. and Canada’s external border, and reduce the emphasis on the U.S.-Canada border itself where levels of interaction and commerce make it more difficult to provide effective security. Over the long term the result would be a system more in line with the European Union approach to control of internal borders. While there has been little discussion of such a system on the U.S. side of the border, there has been considerable discussion in Canada about the potential for an external perimeter strategy (Conference Board of Canada 2002, Hart and Dymond 2001, Dobson 2002). In fact, one recent Windsor newspaper editorial suggested the Canadian government should seriously explore a European Union style border arrangement with the U.S. (Windsor Star 2002).

The “external perimeter approach” would provide an opportunity to save much of the US\$10.3 billion in border related costs identified in this research, would minimize the need for major new investments in border crossing and FIS infrastructure, and reduce the need for additional FIS staff on the border. Such a system could also spur additional cross-border integration and could make a contribution to increasing

the productivity and competitiveness of the two economies. Some have also argued that security could actually be enhanced by focusing resources on the external border where security efforts are more realistic, and refocusing U.S. - Canada border efforts on random inspections and intelligence based activities. For instance, speaking pre 9/11 about the perimeter concept, U.S. Ambassador to Canada Paul Cellucci said “From my way of thinking, if we took the money we would have put into placing more people on the border and put it into law enforcement and intelligence, we’re going to have a much better chance of catching bad guys rather than hoping that we’re going to catch them at the border” (Trickey 2001). Hart and Dymond make a similar point in stating that “the solution lies in intelligence gathering, information sharing, and control of the external border, not in more routine U.S.-Canada border inspections” (Hart and Dymond 2002).

An external perimeter strategy would in effect acknowledge a problem with the current system, the fact that effective security is very difficult to implement given the level of economic and integration across the border, the unguarded nature of the many miles of border, and the fact that gridlock would likely develop from any meaningful level of inspections at existing checkpoints. A number of sources have called attention to this problem in recent years (GSA 2003, Hart and Dymond 2002, Fox News 2002, MSNBC 2002, Detroit News Staff 2002, Trickey 2001, Handelman 2001, Dawson, 2001, Audi 2001). Currently, primary inspections at key crossings average just 30 seconds for cars and 75 seconds for trucks based on the research team’s observations during the summer of 2002. While longer primary inspections can and do occur, any increase in the average processing times at peak periods could quickly lead to gridlock. And while inspectors have the option of referring vehicles to secondary, current auto facilities are extremely limited. In addition, truck inspections in which the back doors are actually opened are extremely rare, and inspections of rail cars and containers crossing the border are even more rare.

The current problems with border security were highlighted in a recent General Accounting Office (GSA) report, that reported on how easy it was for GSA inspectors to enter the country with falsified ID, which in one case was not reviewed, and how easy it was to simply walk across the border unchecked in one location where a park straddles the border (General Accounting Office 2003). While it was not a purpose of this study, during the course of site visits, it also became apparent that there are numerous border crossing points where one can simply walk across unchecked. In fact, at some western crossings U.S. bound truck drivers needing to visit U.S. brokers park on the Canadian side and walk across the border into the U.S. in a completely unsupervised way, and could easily continue on into the U.S. instead of returning to their trucks in Canada.

The difficulties inherent in the current system, and the potential impacts that would result from security upgrades, become apparent when one considers some of the proposed enhancements. The enhancements that have been discussed, all of which could add extensive costs and uncertainty to the system, and potentially increase congestion significantly, include:

- A recently withdrawn requirement for anywhere from a 4-24 hour pre-notification to Customs of the detailed nature of goods traversing the border. While this specific proposal by U.S. Customs was withdrawn, U.S. law requires Customs to develop an advance notice system proposal by October. Any meaningful advance notice system would have a major impact on just-in-time (JIT) cross-border supply chains that often operate in a manner that currently does not even produce a production order until 2-4 hours prior to the expected arrival of the goods on the other side of the border. The likely result of an advance notice system would be a reduction in imports and a loss of benefits that accrued from those imports. Additional costs would also be incurred

to provide information on the detailed nature of goods, something that is not currently required (Cassidy 2003). Detailed reporting could also result in a loss of more favorable non-NAFTA duty treatment applied to an overall generic description today when an importer chooses to enter goods under non-NAFTA provisions.

- Existing law (2002 H.R. 3448 – The Public Health Security and Bioterrorism Preparedness Act) in regards to the importation of agricultural and food products, which would at Section 307 require that importers provide advance notice of the nature of goods being imported. In response, the U.S. FDA has proposed a rule requiring detailed reporting of the contents of a shipment by noon the prior day. Such a policy would likely reduce the level of U.S. imports from Canada, with resulting losses of the cost of living and food quality benefits that attached to these imports. The proposed rules would also disrupt JIT supply chains and add inventory carrying costs to the system. Finally, more trucks would be needed because loads could not be adjusted to fill out empty space on a truck, and trucks would be prohibited from changing crossing locations to take advantage of traffic congestion information (Abboud 2003, Rail Business 2002).
- Existing requirements for 2004-2005 entry-exit checks of all aliens. Such a system could have major impacts on border backups (Cohen 2002).
- Existing policies which call for more extensive border checks of vehicles when the terrorism security threat levels are raised to the “orange” level (Hansen 2003). These policies could make travel at peak periods very difficult. For instance during the week of April 1, 2003, under an orange alert, trucks were backed up one to two hours on several occasions (WJR Radio 2003).
- A recent requirement for Canadian truck drivers to obtain I-94 immigration documents, and that they be presented on arrival and departure as of March 1, 2003 (Strong and Kosdrosky 3003).
- A recent agreement to tighten security on rail cars entering the U.S. from Canada, including a requirement for detailed cargo information to be provided (Nordwall 2003).

An external perimeter approach would alleviate the need to implement many of the above security enhancements on the U.S.-Canada border. Of course, such a policy would require Canada and the U.S. to harmonize some immigration policies on the scrutiny and admissibility standards of immigrants, refugees, and foreign visitors. An external perimeter strategy would also require Canada and the U.S. to more closely cooperate on immigration and customs enforcement offshore and at external borders – changes that are currently already in process to some degree. One key to being able to reduce scrutiny at the U.S.-Canada border is the ability to build a robust system of random inspections and post-audits of the companies that conduct the bulk of trade across the border, and a system of severe penalties for corporate or personal violators of each countries domestic law.

There are of course, many potential problems with such an approach. First, would Canada and the U.S. want to harmonize regulations sufficiently to allow such a system to work? Both in terms of immigration policies, labor policies, and in terms of policies related to third party nations such as Cuba. Secondly, could the “external perimeter” approach really provide an effective level of security, and could random inspection and other approaches on the U.S.-Canada border really provide a sufficient additional measure of security? A third question would relate to how U.S. guns could be kept out of Canada, how Canadian drugs could be kept out of the U.S., and how products such as Cuban cigars could be kept out of the U.S. Would strict penalties and domestic enforcement be able to control such flows? Finally, if the U.S. were to enter into such an arrangement with Canada, how would it treat Mexico?

Over the next few years, the U.S. and Canada will have to consider the long term border strategy they want to pursue. In the long term the two options are increasing the level of resources dedicated to securing this border, or moving towards a more open border with substitution of external border controls.

References

- Abboud, Leila, "Antiterrorism's Hidden Costs," *The Wall Street Journal*, March 26, 2003, A4.
- Audi, Tamara, "High Tech Sentinel," *The Detroit Free Press*, October 28, 2002, A1.
- Barrett, Colin, "Canadian Based Motor Carriers," *Traffic World*, December 21, 1008, 62.
- Barnes, Dennis N., "Cabotage Complexities," *Traffic World*, December 14, 1998, 6.
- Battelle and Texas Transportation Institute, *Evaluation of Travel Time Methods to Support Mobility Performance Monitoring*, for the U.S. Department of Transportation, Federal Highway Administration, April, 2002.
- Bridge and Tunnel Operators Association, *Cross-Border Monthly and YTD Traffic Data*, April 2000 – November 2002.
- Battelle and Texas Transportation Institute, *Evaluation of Travel Time Methods to Support Mobility Performance Monitoring*, April, 2002.
- Broker Interviews with, among others, *Livingston, Tower Group, Del-Will Brokers, Centra Customs Brokers, PBB Global Logistics, Sander and Travis, Transborder Customs Services, Derringer, Norman G. Jenson Brokers, Danzas, J.L. Woods Brokers, GHY Customs Brokers, George H. Young Brokers, and Fed Ex Trade*, Summer, 2002.
- The Buffalo News Staff, "In Buffalo, Washington Ill-Conceived Security [re U.S. exit checks]," *The Buffalo News*, July, 2002.
- Canada Customs, *Border Delay Archive Database for Commercial and Personal Travel North and Southbound*, November, 2001 – August, 2002.
- Canada – U.S. Partnership, *Building a Border for the 21St Century*, December, 2000.
- Canadian Chamber of Commerce, *Creating a Smart, Secure and Trade Efficient Border*, October 17, 2001.
- Canadian Department of Foreign Affairs and International Trade, *The Canada – U.S. Smart Border Declaration*, 2002.
- Canadian Embassy, *United States-Canada: The World's Largest Trading Relationship*, August, 2001.
- Canadian Manufacturers and Exporters Association, *The Value of Boundaries* [Canadian Manufacturers and Exporters Association estimate that border delays and customs regulations drive costs up 6%], *The Toronto Star*, August 11, 2001, P. HO6.
- Canadian Pacific Railway Interview, June, 2002.

Canadian Parliament's Standing Committee on Foreign Affairs and International Trade, *Report on Border Management Issues*, November, 2001.

Canadian Parliament's Standing Committee on Citizenship and Immigration, testimony titled *Hands Across the Border*, December, 2001.

Carrier and 3PL Management and Driver Interviews with, among others, *Chrysler Transport, Reimer Express, Liberty Linehaul, CCX, Yellow Freight, Celadon, S and S Transport, Transfreight, Landstar, Canadian National, Canadian Pacific, Holland Motor Freight, Western Logistics Carriers, Roadway Express, Overland Express, UPS, Cavalier Transportation, Ludke Pacific Trucking, Mercer Trucking, Ryder Logistics, TNT Logistics, Innovative Logistics, Hub Group, Inc., Leading Edge logistics, Wolverine Freight, Schneider National, Tri-State Expeditors, Veerspetin Trucking, TST Expedite, Lamko Fleet, Winnipeg Motor Express, and Eagle Global Logistics*, Summer, 2002.

Cassidy, William B., "All In Good Time," *Traffic World*, January 27, 2003, 8-9.

C.D. Howe Institute, *Shaping the Future of the North American Economic Space*, April, 2002.

Center for Automotive Research, *The Canada – U.S. Border: An Automotive Case Study*, January, 2002.

Coalition for Secure and Trade Efficient Borders, *Rethinking Our Borders: A Plan For Action*, 2001.

Coalition for Secure and Trade Efficient Borders, *Statement of Principles*, 2002.

Cohen, Tom, "U.S. Won't Exempt Canadians From New Security Checks," *Lansing State Journal*, December 21, 2002, A10.

Conference Board of Canada, *Border Choices: Balancing the Need for Security and Trade*, October, 2001.

Cooke, James, "Brave New World," *Logistics Management*, January 1, 2002.

Crossing Operator Interviews with, among others, *Peace Bridge Authority, Niagara Falls Bridge Commission, Detroit International Bridge Company and Canadian Transit Company, Detroit and /Canada tunnel Corporation, Blue Water Bridge Authority, Michigan Department of Transportation Blue Water Bridge Unit*, Summer, 2002.

Dawson, Anne, "Crossing the Line," *The Calgary Sun*, November 17, 2001, 21.

Detroit News Staff, "Prohibit Terrorists From Entering U.S.," *The Detroit News*, Summer, 2002.

Dobson, *Shaping the Future of the North American Economic Space*, C.D. Howe Institute, April, 2002, 1-30.

Duty Related Interviews With Government Agencies including U.S. Customs, Canadian Customs, Canadian Embassy in Washington D.C, U.S. Embassy in Ottawa, U.S. Census Bureau, U.S. International Trade Commission, U.S. Office of the Trade Representative, U.S. Management and Budget, Revenue Canada 2002).

Eastern Border Transportation Coalition, *Truck Freight Crossing the U.S. – Canada Border*, July 17, 2002.

Federal Motor Carrier Safety Administration, U.S. Department of Transportation, *Cabotage Rules for Canadian Drivers*, 2002, and references to *U.S. Customs Notice*, October 1, 1997, *U.S. Customs Memo*, May 8, 1998, and *Treasury Decision 99-10*, February 16, 1999.

Federal Inspection Services (FIS) staff levels composite sources including: U.S. Customs Service, Office of Planning, *Report 003-2001, Projected Optimal Staffing Levels and Annual Increases for Fiscal Years 2000-2002*, February 14, 2001, 1-2; Canadian Department of Finance, *Budget 2001: Enhancing Security For Canadians*, 2001; Hansen, Ronald J., “Border Patrol Staffing Weak,” *The Detroit News*, August 6, 2002, A1; Donnelly, Francis X. and Susan Carney, “Border: Safety vs. Trade,” *The Detroit News*, October 14, 2002, A1; *Canadian – U.S. Partnership*, 1999; *Canada Conference Board*, 2002; presentation by *Jim Philips, Border Trade Alliance*, April 4, 2002; Anonymous, “Security Faltering: Customs Union Boss,” *The Winnipeg Sun*, October 12, 2001, 1-3; Pflieger, Katherine, “Security at Canada Border Threatened,” *The Detroit News*, October 4, 2001, A7; Danese, Roseann, “Border Blues Tackled: U.S. Assigns More Agents,” *The Windsor Star*, October 27, 2001, A1; Machanock, John, “Bill Would Boost Northern Border Guards,” *Lansing State Journal*, October 10, 2001, A10; Ring, Wilson, “INS To Hire 8,000 In Five Months,” *Lansing State Journal*, April 21, 2002, A17; Free Press News Service, “Tighter Border Bill OK’d,” *Detroit Free Press*, May 9, 2002, A5;

Fox News Staff, “Northern Exposure,” *Fox News*, June 4, 2002.

General Accounting Office, *Testimony GAO-03-438T - Weaknesses In Screening Entrants Into The United States*, January 30, 2003

Hansen, Ronald J. and Amy Lee, “Detroit-Windsor Traffic Slows,” *The Detroit News*, March 21, 2003, A10.

Handelman, Stephen, “49th Parallel,” *Time Canada*, July 23, 2001.

Hart, Michael and William Dymond, *Common Borders, Shared Destinies: Canada, the United States and Deepening Integration*, November 20, 2001.

Herbert W. Davis and Company, *Davis Database*, Vol. 27, No. 1, June, 2002.

ICF Consulting, *Economic Effects of Transportation: The Freight Story*, January, 2002, 16.

KPMG, *Report on the Survey of Canadian Commercial Carriers on Border Crossing Issues*, June, 2002.

Kenna, Kathleen, “Think Tank Urges Borderless NAFTA,” *Toronto Star*, September 4, 2001.

Lamko Manufacturing, Interview May, 2002.

Lawson, Brent, “Extra Security Should Speed U.S. Border Crossing,” *The Hamilton Spectator*, March 25, 2002, A5.

Local Government and Chamber Interviews with, among others, *Plattsburgh North Chamber, Greater Niagara Buffalo Partnership, Niagara Falls, Ontario Chamber, Niagara Falls, Ontario Tourism Association, Fort Erie Economic Development Association, Detroit Chamber of Commerce, Windsor Chamber of Commerce, Windsor City Center Business Association, Windsor Traffic Commissioner, Windsor Mayor's Office, Winnipeg Economic Development Corporation, Manitoba Chamber, West Coast Border Coalition, Cascadia Institute, Bellingham-Whatcom Chamber, and Whatcom Council of Governments*, Summer, 2002.

MacFarlane, Stephen, "Border Delays Won't Jeopardize JIT But Tighter Security Essential to Reassure the U.S.," *Canadian Business and Current Affairs*, October 8, 2001.

MacDonald, Don, "Consider Customs Union, Mulroney Urges...," *The Vancouver Sun*, June 19, 2001, D3.

Macdonald, Ian, "Keegan Speaks On Border Issues," *The Montreal Gazette*, July 2, 2001.

Macdonald, Ian, "It's Time To Open Up the Border," *The Montreal Gazette*, July 2, 2002, B3.

Manufacturer and Retailer Interviews with, among others, *General Motors, Daimler-Chrysler, Toyota, Moen, Atlas Tube, Ontario Greenhouse Growers, Kodak Canada, American Axle, Delphi, Mastronardi Produce, Noranda, Lantic Sugar, Canadian Sugar, Family Traditions, Accucamps Industries, Lyndall Cedar Homes, Donnley, Lamko, Meijer, Cooper Standard*, Summer, 2002.

Maring, Gary and Bruce Lambert, *The Freight Analysis Framework: Status and Future Directions*, Federal Highway Administration, Office of Freight Management and Operations, October 3, 2002, 35.

Mazner, Mike, "Michigan Tells U.S. Customs It Needs Help Staffing Canadian Crossings," *MLive-Com*, October 18, 2001.

Morgan, Alfie, presentation on the *Canada-United States Economic Relationship*, to the Canadian House of Commons, Standing Committee on Foreign Affairs and International Trade, on behalf of the Windsor Chamber of Commerce, May 9, 2002.

MSNBC Staff, "Closing the U.S.-Canada Border," *MSNBC*, June 5, 2002.

National Post, "Open Borders" Editorial, September 3, 2001.

Nordwall, Smita P., "U.S., Canada Bolster Rail Cargo Security," *USA Today*, April 5, 2002, A12.

PR Newswire, "Consumers File Amicus Brief With NAFTA Opposing Canadian Softwood Lumber Duties," *PR Newswire*, October 8, 2002.

Public Policy Forum of Canada, *Canada's Policy Issues: Managing Our Border With the U.S.*, November 29, 2001.

Rail Business Staff, "Bioterrorism Rule Could Snarl Traffic At Terminals," *Rail Business*, June 3, 2002, 6.

Schulz, John D., "Con-Way Takes \$8 Security Surcharge," *Traffic World*, November 18, 2002, 45.

Statistics Canada, *Exports and Imports with U.S., Monthly Data*, April, 2000 – June, 2002.

Statistics Canada, *Travel Between Canada and the U.S., Person Trips and Expenditures*, 2nd Qtr, 2001 and 2002.

Statistics Canada, Tourism Program, International Travel Section, *Annual and Monthly Traffic Data Into Canada*, January 2000 – June, 2002.

Statistics Canada, Tourism Program, International Traveler Section, *Returning Canadian and American Visitors by Auto Number of Personal Travelers, Expenditures Out of Country and Additional Traveler Profiles Border-wide*, 2nd qtr. 2001 and 2002.

Strong, Michael, "Just-In-Time Could Be Just-IN-Case," *Crain's Detroit Business*, November 12, 2001.

Strong, Michael, "Keeping The Chain Unbroken," *Crain's Detroit Business*, February 11, 2002.

Strong, Michael and Terry Kosdrosky, "Truck Stop: Automakers Lobby To Ease Restrictions On Trucks At Border," *Crain's Detroit Business*, March 24, 2003, A1.

Toulin, Alan, "Agency Calls for Open Border," *National Post*, July 17, 2001.

Trade Association Interviews with, among others, *Canadian Chamber of Commerce, National Association of Manufacturers, American Trucking Association, Canadian Manufacturers and Exporters Association, Canadian Trucking Alliance, Ontario and British Columbia Trucking Associations, Washington Trucking Association, Canadian International Freight Forwarders Association, Freight Carriers Association of Canada, and the Canadian Society of Customs Brokers*, Summer, 2002.

Trickey, Mike, "The Undefended Border: Economic Concerns Spur Campaign to Erase Line Between Us and the U.S.," *The Montreal Gazette*, August 4, 2001, A12.

Trickey, Mike, "The Undefended Border: Economic Concerns Spur Campaign To Erase Line Between Canada and the U.S.," *Southam News*, August 4, 2001, A12.

U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database, *Annual and Monthly Traffic Data into USA*, 1994-May, 2002.

U.S. Customs, *E-Mails From John T. Peele*, December 10, 2002.

Windsor Chamber of Commerce, *Business Transportation Task Force on Border Crossing Issues*, November, 2002.

Windsor Star Staff, "Border Trade Editorial," *Windsor Star*, March 28, 2003, A10.

Windsor Star Staff, "Perimeter Border for North America Editorial," *Windsor Star*, December 11, 2002.

WJR Radio, "Border Crossing Time Reports," *WJR Radio*, Week of April 1, 2003.

TABLE 1

TWO WAY TRAFFIC INTO CANADA AND USA (000'S OF VEHICLES)

		Truck Traffic				Auto Traffic					
				95-01 %	84-01 %			95-01 %	84-01 %		
Crossing		84 TRK	95 TRK	01 TRK	Cum Grw	Cum Grw	84 Car	95 Car	01 Car	Cum Grw	Cum Grw
St. Step./Mill		102	168	225	33.9%	120.6%	2004	3107	2411	-22.4%	20.3%
Lacolle 5		458	570	785	37.7%	71.4%	1931	2526	2073	-17.9%	7.4%
Fort Erie		674	1146	NA	NA	NA	5609	6388	NA	NA	NA
Rainbow**		9	1	NA	NA	NA	2986	3231	NA	NA	NA
Queenston		490	782	NA	NA	NA	1955	3409	NA	NA	NA
Whpl***		60	6	NA	NA	NA	1170	1390	NA	NA	NA
Niag Sub		1233	1935	2301	18.9%	86.6%	11720	14418	14176	-1.7%	21.0%
ON-NY Sub		1691	2505	3086	23.2%	82.5%	13651	16944	16249	-4.1%	19.0%
Ambas.		616	2233	NA	NA	NA	4360	7492	NA	NA	NA
Dt-Win Tun		773	275	NA	NA	NA	5413	8163	NA	NA	NA
Win. Sub		1389	2508	3239	29.1%	133.2%	9773	15655	15336	-2.0%	56.9%
Sarnia		286	1168	1563	33.8%	446.5%	2911	3922	4264	8.7%	46.5%
ON.-MI Sub		1675	3676	4802	30.6%	186.7%	12684	19577	19600	0.1%	54.5%
Emerson*		155	263	403	53.2%	160.0%	270	408	415	1.7%	53.7%
Pac Hyw		344	766	867	13.2%	152.0%	2656	3215	NA	NA	NA
Peace**		0	0	0	0.0%	0.0%	3614	4948	NA	NA	NA
BC-Wa Sub		344	766	867	13.2%	152.0%	6270	8163	5633	-31.0%	-10.2%
All Other		2039	2930	3983	35.9%	95.3%	19831	29251	24011	-17.9%	21.1%
Total		6006	10308	13366	29.7%	122.5%	54710	77450	68319	-11.8%	24.9%

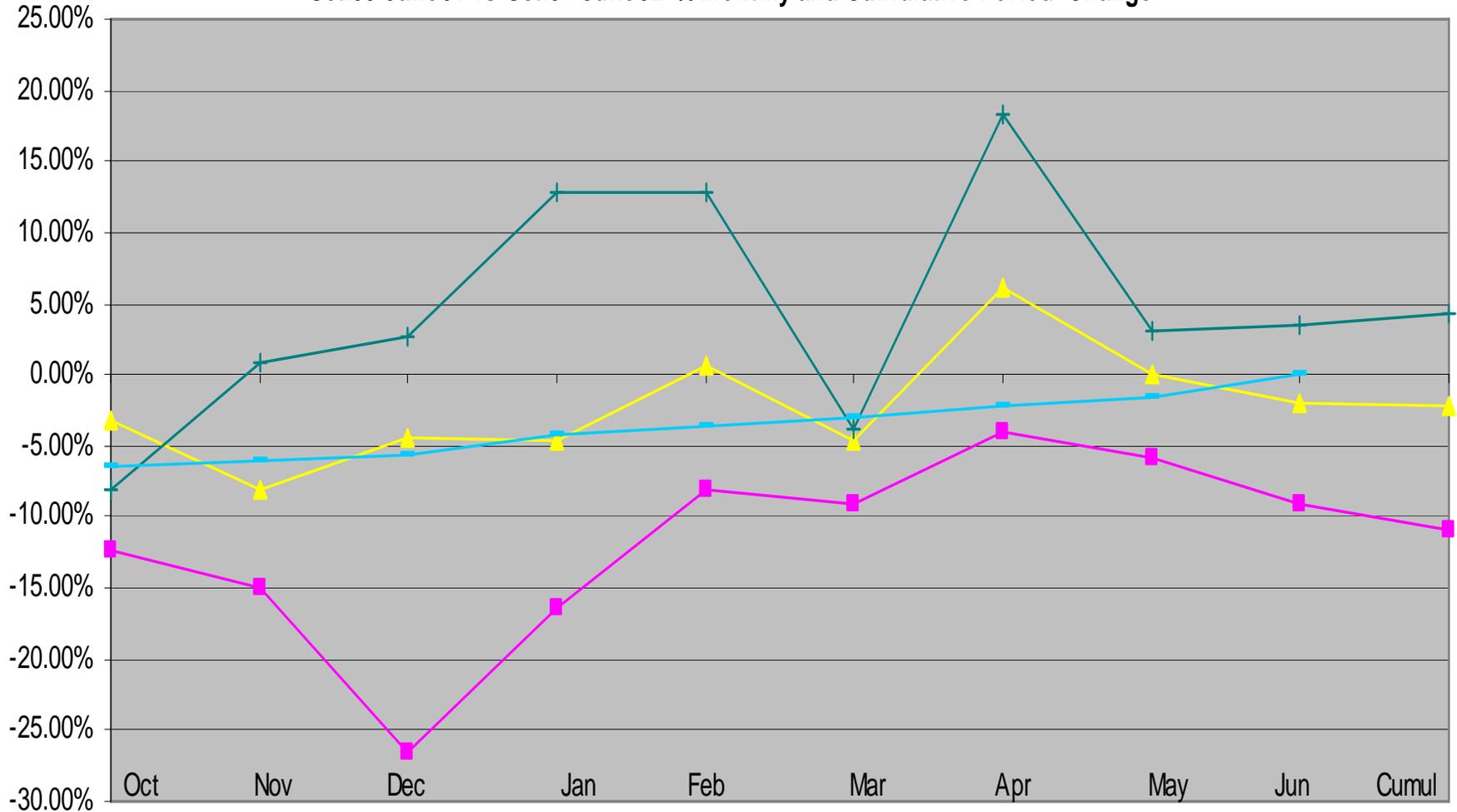
* Note Emerson is estimated for 1984.

** Note Rainbow Bridge and Peace Arch no longer accept traffic. Source: Statistics Canada and U.S. Customs and Border Protection.

*** Note that Whirlpool was closed through most of May, 2001.

Figure 1

Total U.S. - Canada - U.S. Economic Activity, Canadian Land Exports to U.S. and Trucks In
Oct.00-June01 vs Oct.01-June02 % Monthly and Cumulative Period Change



Sources: Statistics Canada, U.S. Customs, Ward's Automotive and U.S. Labor Department



Transit Time and Uncertainty Related Impact Summary (Millions of Annual US\$)

Table 2

Type of Cost	Minimum	Midrange	Maximum
Transit Time/Uncertainty Costs			
Carrier Related			
Primary Inspection Transit Time	275.3	324.2	351.8
Secondary Yard Processing	602.5	755.4	908.3
Excess Plan Time	113.7	416.4	515.7
Reduced Cycles/Other	65.8	120.7	197.4
Driver Documentation/Fax Time	<u>133.5</u>	<u>250.7</u>	<u>400.9</u>
Carrier Subtotal	1190.8	1867.4	2374.1
Manufacturer Related			
Manufacturer Sourcing Benefits	1007.0	1530.0	2000.0
Extra Inventory Carrying Cost	<u>229.0</u>	<u>458.0</u>	<u>686.0</u>
Manufacturer Subtotal	<u>1236.0</u>	<u>1988.0</u>	<u>2686.0</u>
Personal Traveler	<u>96.7</u>	<u>159.0</u>	<u>209.6</u>
Transit Time/Uncertainty Subtotal	2523.5	4014.4	5269.7

General Border Costs and Grand Total (Millions of Annual US\$)

Table 3

Type of Cost	Minimum	Midrange	Maximum
General Border Costs			
Carrier Related			
General Border Administration	100.0	200.0	250.0
Cabotage	<u>100.0</u>	<u>150.0</u>	<u>333.3</u>
Carrier Subtotal	200.0	350.0	583.3
Manufacturer Related			
Brokerage Costs	372.8	462.9	552.9
Duties, Border Fines, and Fees	1337.6	1605.1	1872.3
Customs Administration	<u>2630.0</u>	<u>3290.0</u>	<u>3950.0</u>
Manufacturer Subtotal	4340.4	5358.0	6375.2
Federal Inspection Services Staff	<u>452.9</u>	<u>571.5</u>	<u>960.9</u>
General Border Subtotal	<u>4993.3</u>	<u>6279.5</u>	<u>7919.4</u>
Transit Time and Uncertainty Subtotal	<u>2523.5</u>	<u>4014.4</u>	<u>5269.7</u>
Total U.S.-Canada Border Costs	7516.8	10293.9	13189.1

Truck Primary Transit and Secondary Processing Cost Impacts (Millions of US\$)

Table 4

Category/Assumption	Minimum	Midrange	Maximum
Entering USA			
Primary	\$213.4	\$256.1	\$277.5
Secondary	<u>392.5</u>	<u>483.4</u>	<u>574.4</u>
Total	605.9	739.5	851.9
Entering Canada			
Primary	61.9	68.1	74.3
Secondary	<u>210.0</u>	<u>272.0</u>	<u>333.9</u>
Total	271.9	340.1	408.2
Total U.S.-Canada			
Primary	275.3	324.2	351.8
Secondary	<u>602.5</u>	<u>755.4</u>	<u>908.3</u>
Total	877.8	1079.6	1260.1

The U.S.-Canada Border:
Cost Impacts, Causes, and Short and Long Term Management
Options
Appendix Volume

Dr. John C. Taylor and Dr. Douglas Robideaux

Associate Professors

Grand Valley State University

and

Dr. George C. Jackson

Associate Professor

Wayne State University

for the

Michigan Department of Transportation

U.S. Department of Transportation

New York State Department of Transportation

May 21, 2003

Table of Contents

• Appendix I -Objectives, Analysis Outputs, and Methodology	5
• Appendix II - Sources and Interviews	10
• Appendix III - Traffic Volume Changes	27
• Appendix IV - Economic, Trade and Traffic Changes Pre to Post 9/11	37
• Appendix V - Immediate Post 9/11 Impact	49
• Appendix VI - Macro Level Border Impacts	60
– Cross-Border Freight Rate Penalty	63
– Freight Surcharges	66
– Route Planning Assumptions	68
– Tourism Impacts	71

Table of Contents

• Appendix VII - Primary Inspection Transit Time (Backup) Data	76
• Appendix VIII - Detailed Cost Impacts	94
– Categories of Cost Impacts	96
– Part A - Transit Time/Uncertainty Related Costs	99
• Hourly Costs	100
• A1 - Carrier Related Costs	101
– Primary Transit (Backup) and Secondary Times	102
– Excess Route Planning Time Costs	116
– Reduced Cycles and Other Uncertainty Costs	119
Documentation Time Costs	125
• A2 - Manufacturer Related Costs	128
– Inventory Carrying Costs	129
– Lost Productivity Costs	131
• Part B1 - Personal Traveler Costs	134
– Personal Primary	135
– Business Plan Excess Time	139
• Part C1 - Societal Costs	141

Table of Contents

- Part D - Other Border Related Costs	149
- Part D1 - Carrier	150
- Carrier Customs Administration Costs	151
- Carrier Cabotage Costs	153
• Part D2 - Manufacturer	156
- Customs Brokerage Costs	157
- Border Duties, Fines and Fees	160
- Manufacturer Customs Administration Costs	164
• Part E - Federal Inspection Services Costs	167
- Cost Summaries	170

Appendix I

Objectives, Analysis Outputs, and Methodology

Objectives

- Determine the level of border traffic and changes in traffic volumes.
- Determine the causes of border transit time and uncertainty.
- Estimate impacts for the immediate post 9/11 period and for the more typical post 9/11 period based on 2002 observations.
- Determine estimated transit time and uncertainty for commercial and personal travel in each direction for key crossings and in total.
- Examine changes in economic activity, trade and cross-border traffic for comparable pre and post 9/11 time periods.
- Determine macro indicators of border cost impact such as those related to cross-border freight rate penalties.
- Determine the various categories of cost impacts at the border.
- Determine the estimated dollar costs of specific impacts and total border related costs in absolute dollars and as a percentage of truck borne trade and total trade in goods.
- Discuss possible short term and long term solutions to border transit time and uncertainty costs, including alternative border management strategies and their implications.

Summary of Key Data and Analysis Outputs

- Key traffic data for pre and post 9/11 with long term history for key crossings and in total.
- Summary of key trends in pre to post 9/11 economic activity, cross-border trade and traffic levels.
- Review of immediate post 9/11 impacts in September to December period including review of transit time data for those time periods.
- Macro estimates of border crossing commercial impacts based on recent studies, border crossing time being built into routes overall, and the level of cross-border freight rates and carrier border surcharges.
- Macro estimates of tourism impacts using analysis of Statistics Canada traveler series data on number of Americans entering Canada and number of returning Canadians, including dollar spending in the U.S. and Canada by traveler. For the 2nd Qtr pre 9/11 and post 9/11 2001 and 2002.
- Use of Canada Customs transit time archives for estimation of primary inspection transit times (backup times) by key crossing, for all others, and in total.

Summary of Key Data and Analysis Outputs

- Estimation of transit time related cost impacts on carriers and manufacturers, society in general and government with high, medium and low range estimates for those categories that are quantifiable. Costs include those related to primary inspection transit time (backup time), secondary inspection yard processing times, extra route time, faxing time, etc. for carriers; possible lost productivity and inventory costs for manufacturers; and other environmental, safety, and lost tourism impacts for government and society.
- Estimation of additional border crossing related costs for manufacturers, carriers, and government with high, medium and low estimates for those categories that are quantifiable. Costs include those related to brokerage; border related fines, fees and duties, customs administration for manufacturers, cabotage and MIS investment for carriers; and staff costs for FIS.

Methodology

- Secondary literature review
 - Newspapers and trade magazines
 - Border related reports
- Site visits to key crossings
- Obtaining traffic data and analyzing
- Obtaining existing transit time data and analyzing
- Obtaining and reviewing other studies
- Interviews of key organizations/persons
- Development of border cost impact categories
- Estimation of border related costs by impact category and in total
- Analysis of causes of extended transit times and possible short and long term solutions
- Analysis of implications and possible alternative border management strategies

Appendix II

Sources and Interviews

Sources and Interviews Summary

- Reviewed 750+ newspaper articles since 9/11 in some 23 Canadian and 18 U.S. newspapers and summarized content by topic and crossing.
- Reviewed some 25 generic reports on broad strategic approaches to managing the U.S - Canada border, including key Canadian reports on “external perimeter” strategies.
- Reviewed approximately 20 crossing specific border management reports.
- Reviewed several reports/studies on general or crossing specific border delay times and/or costs, including a key report by Battelle on pre 9/11 delay estimates, a post 9/11 report by KPMG Canada on the cost of border delays, and a Center for Automotive Research report on the impact of delays and uncertainty on the automotive industry.
- Visited border crossings 19+ times including visits to Michigan-Ontario crossings, the Champlain-Lacolle and neighboring crossings, Pembina-Emerson, the four Washington-British Columbia crossings along the coast, and the four Buffalo-Niagara area crossings.

Sources and Interviews

Summary

- Reviewed extensive trade, traffic, tourism and primary inspection transit time data including a key archive of transit time data maintained by Canada Customs. This data covers some 20 key crossings and includes a report every three hours by Canada Customs local officials on estimated primary inspection transit times for trucks and for cars, for both entry to the U.S. and to Canada. Other key reports included Statistics Canada and U.S. Customs traffic data, and Statistics Canada tourism data for pre 9/11 and post 9/11 time periods.
- Interviewed some 173 organizations including large and small Canadian and U.S. manufacturers, carrier management, drivers, third party logistics services providers, brokers, trade associations, local chambers of commerce and tourism associations, economic development agencies, federal inspection services, and border crossing operators.
- See the following slides for a summary of secondary sources and interviews by type of organization.

Secondary Sources

Newspapers

- Reviewed all newspaper articles on border issues since 9/11:
 - Some 23 Canadian papers and 18 U.S. papers
 - Including papers such as:
 - The Ottawa Citizen
 - Toronto Globe and Mail
 - National Post
 - Financial Post
 - New Brunswick Telegram Jnl
 - Windsor Star
 - Niagara Falls Tribune
 - Sarnia Times
 - Vancouver Sun
 - Associated Press
 - New York Times
 - Washington Post
 - Portland Press Herald
 - Buffalo Times
 - The Niagara Gazette
 - Detroit News
 - Detroit Free Press
 - Port Huron Harold Times
 - Seattle Times
 - Bellingham Herald

An estimated 750 generic border and crossing specific articles reviewed and summarized by topic and/or impact category.

Secondary Sources

Border Management Reports

- Reviewed some 25 generic reports on broad border strategy approaches and/or specific management issues.
- Examples include:
 - Canadian Department of Foreign Affairs and International Trade, *The Canada – U.S. Smart Border Declaration*, 2002
 - The Conference Board of Canada, *Border Choices: Balancing the Need for Security and Trade*, October, 2001
 - Public Policy Forum of Canada, *Canada's Policy Issues: Managing Our Border With the U.S.*, November 29, 2001
 - Canadian Chamber of Commerce, *Creating a Smart, Secure and Trade Efficient Border*, October 17, 2001
 - Coalition for Secure and Trade Efficient Borders, *Statement of Principles*, 2002
 - C.D. Howe Institute, April, 2002 *Shaping the Future of the North American Economic Space*

Secondary Sources

Border Management Reports

Canada – U.S. Partnership, *Building a Border for the 21st Century*, December, 2000

Canadian Parliament's Standing Committee on Foreign Affairs and International Trade, *Report on Border Management Issues*, November, 2001

Eastern Border Transportation Coalition, *Truck Freight Crossing the U.S. – Canada Border*, July 17, 2002

- . Reviewed some 20 crossing specific border management reports
 - Examples include:
 - . Windsor Chamber of Commerce, Business Transportation Task Force, *Report on Border Issues*, September 26, 2002
 - . New Brunswick Department of Transportation, *St. Stephen – Calais Border Crossing Study: Preliminary Assessment of Options*, January, 2002
 - . Cambridge Systematics, *Washington Cross Border Trade and Travel Study, Parts I and II*, 2001

Secondary Sources

Delay Studies

Center for Automotive Research, *The Canada – U.S. Border: An Automotive Case Study*, January, 2002

KPMG, *Report on the Survey of Canadian Commercial Carriers on Border Crossing Issues*, June, 2002

Battelle and Texas Transportation Institute, *Evaluation of Travel Time Methods to Support Mobility Performance Monitoring*, for the U.S. Department of Transportation, Federal Highway Administration, April, 2002

Anonymous, *The Value of Boundaries* [Canadian Manufacturers and Exporters Association estimate that border delays and customs regulations drive costs up 6%], *The Toronto Star*, August 11, 2001, P. HO6

TSI Consultants, *IMTC Commercial Vehicle Delay Survey*, *Burmaly*, British Columbia, April, 2001

Gannet Fleming, Inc., *Ferry Point International Border Crossing Freight Delay Study Summary*, September, 2002

Site Visits

- Michigan – Ontario
 - May 20, 2002 – BWB
 - June 19, 2002 - DET
 - June 27-28, 2002 - BWB
 - July 7-9, 2002 – BWB
 - July 23, 2002 - DET
 - July 26, 2002 - DET
 - July 31, 2002 - DET
 - August 2, 2002 - DET
 - August 6, 2002 - DET
 - August 8, 2002 - BWB
 - September 12, 2002 - DET
 - October 11, 2002 - DET
- Champlain - Lacolle
 - August 10-13, 2002
- Pembina- Emerson
 - July 29-30, 2002
- Washington – British Columbia
 - July 13-17, 2002
- Buffalo - Niagara
 - July 1-3, 2002
 - July 23-25, 2002
 - July 6-9, 2002

Traffic, Trade, Tourism and Delay Data

- Bridge and Tunnel Operators Association, *Cross-Border Monthly and YTD Traffic Data*, April 2000 – November 2002
- U.S. Customs Service, Mission Support Services, Office of Field Operations, Operations Management Database, *Annual and Monthly Traffic Data into USA*, 1994-May, 2002
- Statistics Canada, Tourism Program, International Travel Section, *Annual and Monthly Traffic Data Into Canada*, January 2000 – June, 2002
- Statistics Canada, Tourism Program, International Traveler Section, *Returning Canadian and American Visitors by Auto Number of Personal Travelers, Expenditures Out of Country and Additional Traveler Profiles Border-wide*, 2nd qtr. 2001 and 2002
- Statistics Canada, *Exports and Imports with U.S., Monthly Data*, April, 2000 – June, 2002
- Statistics Canada, *Travel Between Canada and the U.S., Person Trips and Expenditures*, 2nd Qtr, 2001 and 2002
- Canada Customs, *Border Delay Archive Database for Commercial and Personal Travel North and Southbound*, November, 2001 – August, 2002

Organizations/Individuals Interviewed

- 173 interviews of organizations and individual drivers.
- Interviews of national organizations and crossing specific organizations.
- Interviews of manufacturers, carriers, drivers, third parties, brokers, trade associations, local chambers and tourism associations, FIS's, crossing authorities/operators.

Selected Interviews

Trade Associations

- _ Canadian Chamber of Commerce
- National Association of Manufacturers
- American Trucking Association
- Canadian Manufacturers and Exporters Association
- Canadian Vehicle Manufacturers Association
- Canadian Trucking Alliance
- Canadian International Freight Forwarders Association
- Canadian Society of Customs Brokers
- Freight Carriers Association of Canada
- Ontario Trucking Association
- British Columbia Trucking Association
- Washington Trucking Association
- Northern Brokers Association

Selected Interviews

Carriers/3PL's

- Carriers

- Chrysler Transport
- Potonski Trucking
- Reimer Express
- Liberty Linehaul
- CCX
- Yellow Freight
- Celadon
- S and S Transport
- Transfreight
- Landstar
- Canadian National
- Canadian Pacific
- Holland Motor
- Western Logistics Carriers

- Roadway Express
- Overland Express
- United Parcel Service
- Landstar
- Cavalier Transportation
- Ludtke Pacific Trucking
- Mercer Trucking

- 3PL'S

- Ryder Logisitcs
- TNT Logistics
- Innovative Logistics
- Hub Group, Inc.
- Leading Edge Logistics

Selected Interviews

Driver Sample

- Eagle Global Logistics
- Wolverine Freight
- CCX
- Schneider
- Tri-State Expeditors
- Chrysler Transport
- Veerspetin
- Overland
- TST Expedite
- Rapco
- Lamko Fleet
- Winnipeg Motor Express

Selected Interviews

Brokers

- Tower Group
- Livingston
- Del-Will Brokers
- Centra Customs Brokerage
- PBB Global Logistics
- Sander and Travis
- Transborder Customs Services
- Derringer
- Norman G. Jenson Brokers
- Danzas
- J.L. Woods
- GHY Customs Brokers
- George H. Young
- Fed Ex Trade

Selected Interviews

Manufacturers/Retailers

- General Motors
- Daimler Chrysler
- Toyota
- Moen
- Atlas Tube
- Ontario Greenhouse Growers
- Kodak Canada
- American Axle
- Delphi
- Kscrap Resources
- Mastronardi Produce
- Noranda
- Tecsys
- Lantic Sugar
- Canadian Sugar
- Family Traditions
- Accucamps Industries
- Lyndall Cedar Homes
- Donnley
- Lamko Die Molding
- Meijer
- Cooper Standard

Selected Interviews

Local Government and Chambers

- Manitoba Chamber
- Plattsburgh North Chamber
- Greater Niagara/Buffalo Partnership
- Niagara Falls, Ontario Chamber of Commerce
- Niagara Falls, Ontario Tourism Association
- Fort Erie Economic Development Corporation
- Detroit Chamber of Commerce
- Windsor Chamber of Commerce
- Windsor City Center Business Association
- Windsor Traffic Commissioner
- Winnipeg Economic Development Corporation
- West Coast Border Coalition
- Cascadia Institute
- Bellingham-Whatcom Chamber
- Whatcom Council of Governments

Selected Interviews

Operators

- Peace Bridge Authority
- Niagara Falls Bridge Commission
- Detroit International Bridge Company and Canadian Transit Company
- Detroit and Canada Tunnel Corporation
- Blue Water Bridge Authority
- Michigan Department of Transportation Blue Water Bridge

Appendix III

Traffic Volume Changes

Traffic Summary

- U.S. Customs and Stats Canada border-wide U.S.- Canada data show following 1984 to 2001 changes in volume:
 - Entering U.S. 1984-2001
 - Personal vehicles up 22.1% or 1.30%/year
 - Commercial vehicles up 122.3% or 7.20%/year
 - Entering Port Huron grew the fastest at 21.98% per year
 - Entering Canada 1984-2001
 - Personal vehicles up 27.8% or 1.64%/year
 - Commercial vehicles up 122.8% or 7.22%/year
 - Entering Sarnia grew the fastest at 33.02% per year
 - This data indicates fairly modest growth in auto traffic since 1984 with much stronger growth in commercial traffic since 1984.

Traffic Summary

- From 1995 to 2001 the same data sets as above show the following changes in volume:
 - Entering U.S. 1995-2001
 - Personal vehicles down 11.7% or 2.0%/year
 - Commercial vehicles up 31.6% or 5.3%/year
 - Entering Canada 1995-2001
 - Personal vehicles down 11.9% or 2.0%/year
 - Commercial vehicles up 27.7% or 4.6%/year
 - During this time period personal vehicle traffic actually declined significantly, and the growth in truck traffic was slower than was the case in the 1984-1995 time period.
 - The decline in personal vehicle traffic was due to a combination of the higher than normal peak traffic levels in 1995, and the abnormally low 2001 volumes resulting from the slowing economy and 9/11. The 1995 peak was due to the strong Canadian dollar in 1995, strong tax incentives for cross-border activity in cigarettes, and other factors.

Traffic Summary

- The Bureau of Transportation Statistics inbound to U.S. commercial truck data show full year 2000 to 2001 border wide decreases in truck traffic as follows:
 - From Canada trucks down 4.7%
 - From Mexico trucks down 4.9%
 - It is interesting to note that the decreases in traffic occurred in almost every month on both entries from Canada and Mexico.
- Bridge and Tunnel Operators Association bi-directional data for September, 2001 and 2002 YTD show:
 - Passenger traffic down 9.04%
 - Truck traffic up 3.19%
- Note that 70% of all trucks entering Canada had Canadian license plates in Statistics Canada reports.

TRAFFIC LEVELS BY CROSSING
ENTERING USA
PERSONAL VEHICLES
U.S. CUSTOMS DATA
000'S OF VEHICLES

										May YTD			
										84-95 %	95-01 %	84-01 %	01-02 %
Crossing	1984	1995	2001	May01YTD	May02YTD	Avg Grwth	Avg Grwth	Avg Grwth	Totl Grwth				
St. Step./Milltown	1035	1651	1233	508	334	5.4%	-4.2%	1.1%	-34.3%				
Lacolle 5 Crossings	914	1244	1013	314	336	3.3%	-3.1%	0.6%	7.01%				
Fort Erie	2782	3128	NA	NA	NA	NA	NA	NA	NA				
Rainbow Bridge**	1526	1633	NA	NA	NA	NA	NA	NA	NA				
Queenston	917	1620	NA	NA	NA	NA	NA	NA	NA				
Whirlpool Bridge***	563	707	NA	NA	NA	NA	NA	NA	NA				
Niagara Subtotal	5788	7088	7396	2784	2793	2.0%	0.7%	1.6%	0.3%				
Ont.-New York Sub	6702	8332	8409	3098	3129	2.2%	0.2%	1.5%	1.00%				
Ambassador Bridge	2115	3632	NA	NA	NA	6.5%	NA	NA	NA				
Det-Win Tunnel	2819	4174	NA	NA	NA	4.4%	NA	NA	NA				
Windsor Subtotal	4934	7806	7585	3428	2789	5.3%	-0.5%	3.2%	-18.64%				
Sarnia	1488	2026	2199	860	771	3.3%	1.4%	2.8%	-10.35%				
Ont.-Mich Sub	6422	9832	9784	4288	3560	4.8%	-0.1%	3.1%	-16.98%				
Emerson*	150	248	216	74	72	5.9%	-2.2%	2.6%	-2.70%				
Pac Highway	911	1483	NA	NA	NA	5.7%	NA	NA	NA				
Peace Arch**	1807	2666	NA	NA	NA	4.3%	NA	NA	NA				
Brit Col.-Wash Sub	2718	4149	2892	1216	958	4.8%	-5.0%	0.4%	-21.22%				
All Other	11076	14654	11774	4395	4000	2.9%	-3.3%	0.4%	-8.99%				
Total U.S. Canada	28103	38866	34308	13579	12053	3.5%	-2.0%	1.3%	-11.24%				

* Note Emerson is estimated for 1984.

*** Note that Whirlpool was closed through most of May, 2001.

TRAFFIC LEVELS BY CROSSING

ENTERING USA

COMMERCIAL VEHICLES

U.S. CUSTOMS DATA

000'S OF VEHICLES

									May YTD
						84-95 %	95-01 %	84-01 %	01-02 %
Crossing	1984	1995	2001	May01YTD	May02YTD	Avg Grwth	Avg Grwth	Avg Grwth	Totl Grwth
St. Step./Milltown	50	102	144	58	53	9.5%	6.9%	11.06%	-8.62%
Lacolle 5 Crossings	217	269	382	160	151	2.2%	7.0%	4.47%	-5.63%
Fort Erie	348	566	NA	NA	NA	5.7%	NA	NA	NA
Rainbow Bridge	1	1	NA	NA	NA	0.0%	NA	NA	NA
Queenston	287	379	NA	NA	NA	2.9%	NA	NA	NA
Whirlpool Bridge***	30	3	NA	NA	NA	-8.2%	NA	NA	NA
Niagara Subtotal	666	949	1124	488	497	3.9%	3.1%	4.05%	1.84%
Ont.-New York Sub	883	1218	1506	648	648	3.4%	3.9%	4.15%	0.00%
Ambassador Bridge	83	1075	NA	NA	NA	108.7%	NA	NA	NA
Det-Win Tunnel	718	131	NA	NA	NA	-7.4%	NA	NA	NA
Windsor Subtotal	801	1206	1462	729	713	4.6%	3.5%	4.85%	-2.19%
Sarnia	175	618	829	350	376	23.0%	5.7%	21.98%	7.43%
Ont.-Mich Sub	976	1824	2291	1079	1089	7.9%	4.3%	7.93%	0.93%
Emerson*	75	143	220	98	89	8.2%	9.0%	11.37%	-9.18%
Pac Highway	182	369	472	203	173	9.3%	4.7%	9.37%	NA
Peace Arch**	0	0	0	0	0	NA	NA	NA	NA
Brit Col.-Wash Sub	182	369	472	203	173	9.3%	4.7%	9.37%	-14.78%
All Other	882	1494	2144	816	833	6.3%	7.3%	8.42%	2.08%
Total U.S. Canada	3048	5150	6777	2902	2885	6.3%	5.3%	7.20%	-0.59%

* Note Emerson is estimated for 1984.

*** Note that Whirlpool was closed through most of May, 2001.

TRAFFIC LEVELS BY CROSSING

ENTERING CANADA

PERSONAL VEHICLES

STATISTICS CANADA DATA

000'S OF VEHICLES

											May YTD			
											84-95 %	95-01 %	84-01 %	01-02 %
Crossing	1984	1995	2001	May01YTD	May02YTD	Avg Grwth	Avg Grwth	Avg Grwth	Totl Grwth					
St. Step./Milltown	969	1456	1178	468	395	4.6%	-3.2%	1.27%	-15.60%					
Lacolle 5 Crossings	1017	1282	1060	369	375	2.4%	-2.9%	0.25%	1.63%					
Fort Erie	2827	3260	3334	1267	1221	1.4%	0.4%	1.05%	-3.63%					
Rainbow Bridge**	1460	1598	2082	747	784	0.9%	5.0%	2.51%	4.95%					
Queenston	1038	1789	1221	610	541	6.6%	-5.3%	1.04%	-11.31%					
Whirlpool Bridge***	607	683	143	72	12	1.1%	-13.2%	-4.50%	-83.33%					
Niagara Subtotal	5932	7330	6780	2696	2558	2.1%	-1.3%	0.84%	-5.12%					
Ont.-New York Sub	6949	8612	7840	3065	2933	2.2%	-1.5%	0.75%	-4.31%					
Ambassador Bridge	2245	3860	NA	NA	NA	6.5%	NA	NA	NA					
Det-Win Tunnel	2594	3989	NA	NA	NA	4.9%	NA	NA	NA					
Windsor Subtotal	4839	7849	7751	3485	2849	5.7%	-0.2%	3.54%	-18.25%					
Sarnia	1423	1896	2065	814	723	3.0%	1.5%	2.65%	-11.18%					
Ont.-Mich Sub	6262	9745	9816	4299	3572	5.1%	0.1%	3.34%	-16.91%					
Emerson*	120	160	199	71	68	3.0%	4.1%	3.87%	-4.23%					
Pac Highway	1745	1732	1051	431	413	-0.1%	-6.6%	-2.34%	-4.18%					
Peace Arch**	1807	2282	1690	736	483	2.4%	-4.3%	-0.38%	-34.38%					
Brit Col.-Wash Sub	3552	4014	2741	1167	896	1.2%	-5.3%	-1.34%	-23.22%					
All Other	8755	14597	12237	4426	4047	6.1%	-2.7%	2.34%	-8.56%					
Total U.S. Canada	26607	38584	34011	13496	11911	4.1%	-2.0%	1.64%	-11.74%					

* Note Emerson is estimated for 1984 and 1995.

** Per Statistics Canada reported as 0, however assuming same volume as reported for U.S. entry.

*** Note that Whirlpool was closed through most of May, 2001.

TRAFFIC LEVELS BY CROSSING

ENTERING CANADA

COMMERCIAL VEHICLES

STATISTICS CANADA DATA

000'S OF VEHICLES

										May YTD			
										84-95 %	95-01 %	84-01 %	01-02 %
Crossing	1984	1995	2001	May01YTD	May02YTD	Avg Grwth	Avg Grwth	Avg Grwth	Totl Grwth				
St. Step./Milltown	52	66	81	32	28	2.4%	3.8%	3.28%	-12.50%				
Lacolle 5 Crossings	241	301	403	167	168	2.3%	5.6%	3.95%	0.60%				
Fort Erie	326	580	675	291	276	7.1%	2.7%	6.30%	-5.15%				
Rainbow Bridge**	8	0	0	0	0	NA	NA	NA	NA				
Queenston	203	403	502	216	218	9.0%	4.1%	8.66%	0.93%				
Whirlpool Bridge***	30	3	0	0	0	-8.2%	-16.7%	-5.88%	NA				
Niagara Subtotal	567	986	1177	507	494	6.7%	3.2%	6.33%	-2.56%				
Ont.-New York Sub	808	1287	1580	674	662	5.4%	3.8%	5.62%	-1.78%				
Ambassador Bridge	533	1158	NA	NA	NA	10.7%	NA	NA	NA				
Det-Win Tunnel	55	144	NA	NA	NA	14.7%	NA	NA	NA				
Windsor Subtotal	588	1302	1777	784	774	11.0%	6.1%	11.89%	-1.28%				
Sarnia	111	550	734	309	320	36.0%	5.6%	33.02%	3.56%				
Ont.-Mich Sub	699	1852	2511	1093	1094	15.0%	5.9%	15.25%	0.09%				
Emerson*	80	120	183	79	86	4.5%	8.8%	7.57%	8.86%				
Pac Highway	162	397	395	170	162	13.2%	-0.1%	8.46%	-4.71%				
Peace Arch**	0	0	0	0	0	NA	NA	NA	NA				
Brit Col.-Wash Sub	162	397	395	170	162	13.2%	-0.1%	8.46%	-4.71%				
All Other	1157	1436	1839	778	800	2.2%	4.7%	3.47%	2.83%				
Total U.S. Canada	2958	5158	6589	2826	2832	6.8%	4.6%	7.22%	0.21%				

* Note Emerson is estimated for 1984 and 1995.

** Per Statistics Canada data as reported.

*** Note that Whirlpool was closed through most of May, 2001.

COMMERCIAL VEHICLES

ENTERING USA 2001 vs. 2002

BUREAU OF TRANSPORTATION STATISTICS

000'S OF VEHICLES

Month	From Canada			From Mexico			Total U.S. Entry		
	2000	2001	% Change	2000	2001	% Change	2000	2001	% Change
January	563	579	2.84%	357	359	0.56%	920	939	2.07%
February	574	532	-7.32%	377	342	-9.28%	951	875	-7.99%
March	637	596	-6.44%	414	388	-6.28%	1051	985	-6.28%
April	575	569	-1.04%	359	352	-1.95%	934	921	-1.39%
May	635	626	-1.42%	402	388	-3.48%	1037	1013	-2.31%
June	613	585	-4.57%	400	361	-9.75%	1013	946	-6.61%
July	529	529	0.00%	357	343	-3.92%	886	872	-1.58%
August	632	601	-4.91%	411	374	-9.00%	1043	975	-6.52%
September	589	542	-7.98%	367	333	-9.26%	955	875	-8.38%
October	627	607	-3.19%	388	385	-0.77%	1015	993	-2.17%
November	600	500	-16.67%	364	356	-2.20%	964	857	-11.10%
December	475	455	-4.21%	329	322	-2.13%	804	777	-3.36%
Total Year	7049	6721	-4.65%	4525	4303	-4.91%	11573	11028	-4.71%

TOTAL VEHICLE TRAFFIC
 BIDIRECTIONAL
 BRIDGE AND TUNNEL OPERATORS ASSOCIATION
 000'S OF VEHICLES

Crossing	Passenger Cars				Trucks			
	September YTD				September YTD			
	2001	2002	% Change		2001	2002	% Change	
Ambassador Bridge	6332	5380	-15.03%		2467	2517	2.03%	
Detroit-Windsor Tunn	6111	5050	-17.36%		135	114	-15.56%	
Det-Wind Subtotal	12443	10430	-16.18%		2602	2631	1.11%	
Blue Water Bridge	3317	3002	-9.50%		1175	1268	7.91%	
Sault Ste. Marie	1681	1443	-14.16%		99	98	-1.01%	
Mich-Ont Subtotal	17441	14875	-14.71%		3876	3997	3.12%	
Peace Bridge	5365	5223	-2.65%		1012	1017	0.49%	
Lewiston-Queenston	2640	2614	-0.98%		741	790	6.61%	
Rainbow Bridge	3305	3316	0.33%		0	0		
Whirlpool Rapids	507	256	-49.51%		0	0		
Niagara Subtotal	11817	11409	-3.45%		1753	1807	3.08%	
Seaway Bridge	1726	1783	3.30%		102	110	7.84%	
Ogdensburg Bridge	361	337	-6.65%		42	48	14.29%	
Thousand Islands	1350	1334	-1.19%		406	414	1.97%	
Eastern NY	3437	3454	0.49%		550	572	4.00%	
Ny-Ont Subtotal	15254	14863	-2.56%		2303	2379	3.30%	
Total BTOA	32695	29738	-9.04%		6179	6376	3.19%	

Appendix IV
Economic, Trade and Traffic
Comparisons
Pre 9/11 to Post 9/11
Nine Months

Comparison of Changes in Economic Activity, Trade, and Vehicle Traffic Pre 9/11 vs. Post 9/11 Nine Month Period

- In order to observe macro level impacts on sourcing, inventory, and traffic, a comparison of border wide % changes in volume for the nine months pre to post 9/11, comparing October 1, 2000 to June 30, 2001 and October 1, 2001 to June 30, 2002 was conducted.
- The border-wide results are shown in the following tables and graphs. The table summarizes % changes in all values for both countries and each direction of movement. Cumulative 9 month pre 9/11 to post 9/11 % changes are also shown. The graphs summarize the changes for various directions of travel and combinations of variables.
- Focusing on U.S. economic activity and inbound trade and truck traffic to the U.S., where the most significant changes occurred, it is interesting to note that:
 - The U.S. industrial production index was down every month by anywhere from 1.50-6.51%, or by a simple average of 3.66%.
 - Auto production in the U.S. was up 4.24% overall.
 - U.S. land based imports from Canada were down 10.83%.
 - Trucks entering the U.S. from Canada were down just 2.19%.

Comparison of Changes in Economic Activity, Trade, and Vehicle Traffic Pre 9/11 vs. Post 9/11 Nine Month Period

- The data suggests that the Canadian share of U.S. economic activity fell considerably during this time period, and by more than what would be expected as a result of changes in economic activity.
 - While just a few interviewees suggested there might be concerns about sourcing from Canada among U.S. industrial buyers, there have been considerable concerns in Canada that this might happen. Numerous reports by key Canadian trade organizations mention this.
 - One Canadian manufacturer that was interviewed indicated they had lost a deal in the U.S. that was at least in part due to border concerns.
 - A Tier 1 auto supplier in the U.S. also indicated that they had pulled back a new plant investment scheduled for Canada in large part because of border crossing time uncertainty.

Comparison of Changes in Economic Activity, Trade, and Vehicle Traffic

Pre 9/11 vs. Post 9/11 Nine Month Period

- The data also suggests that the reduced level of trade is being spread over more trucks since imports were down by 10.83% but truck traffic was down just 2.19%.
 - It is unlikely that this is due to a decline in non-truck based rail trade. It is more likely that the same number of trucks were in effect running less full.
 - It also may be that some shipments were sent on an expedited truckload basis to avoid secondary inspection yards whenever possible (TL's seldom enter secondary but LTL's always do due to multiple consignments per truck), thereby increasing the number of trucks for a given level of trade.
- Later in the report, when detailed border cost estimates are calculated, the above data will be utilized to further analyze the impact of less Canadian sourcing, and to calculate the lost productivity cost impact of this reduced sourcing.
- The following table and graphs include a table showing all absolute values for the data, and also include graphs showing % changes in volumes for specific categories of data including personal vehicle traffic, truck traffic, and various combinations of economic activity, trade, and traffic for specific directions of travel.

COMPARISON OF ECONOMIC ACTIVITY, LAND BASED TRADE LEVELS, AND TRUCK ACTIVITY

Month	LAND TRADE DATA		US TRAFFIC		INCOMING CANADA TRAFFIC	
	Canadian Exports (to US)	US Exports (to Canada)	Incoming (to US) Trucks	Incoming (to US) Personal Vehicles	Trucks	Personal Vehicles
Oct-00	\$18,626,093,115	\$13,516,921,598	626,833	3,139,788	595,505	2,998,738
Nov-00	\$18,114,343,655	\$12,911,868,451	600,470	2,678,751	569,397	2,577,393
Dec-00	\$17,418,799,067	\$11,458,262,196	475,067	2,492,742	478,289	2,422,888
Jan-01	\$18,015,725,366	\$11,839,247,411	579,172	2,507,473	551,207	2,425,465
Feb-01	\$16,570,609,956	\$11,847,673,321	532,495	2,346,471	522,980	2,313,324
Mar-01	\$18,303,601,140	\$13,800,470,460	596,446	2,787,843	598,652	2,790,037
Apr-01	\$17,695,192,532	\$12,886,986,199	568,784	2,820,914	548,562	2,845,796
May-01	\$18,642,621,748	\$13,597,935,548	625,675	3,117,367	604,967	3,122,817
Jun-01	\$17,960,380,081	\$13,455,218,385	585,144	3,403,191	573,820	3,360,953
TOTAL	\$161,347,366,660	\$115,314,583,569	5,190,086	25,294,540	5,043,379	24,857,411
Oct-01	\$16,589,151,516	\$12,548,098,246	607,236	2,223,417	577,919	2,182,884
Nov-01	\$15,749,220,312	\$11,890,740,533	555,441	2,180,452	548,485	2,156,255
Dec-01	\$13,759,363,073	\$10,146,325,917	455,087	2,172,450	458,818	2,199,767
Jan-02	\$15,043,275,699	\$10,844,744,582	552,363	2,166,570	536,664	2,094,513
Feb-02	\$15,244,982,314	\$11,336,679,459	535,575	2,111,234	521,944	2,041,464
Mar-02	\$16,638,606,312	\$12,777,207,132	568,295	2,487,140	571,346	2,489,609
Apr-02	\$16,973,445,006	\$12,805,185,148	603,586	2,510,446	581,870	2,495,078
May-02	\$17,544,768,357	\$13,385,730,406	625,334	2,777,310	621,455	2,791,304
Jun-02	\$16,326,883,523	\$13,013,013,440	573,692	2,876,887	560,235	2,948,201
TOTAL	\$143,869,696,112	\$108,747,724,863	5,076,609	21,505,906	4,978,736	21,399,075

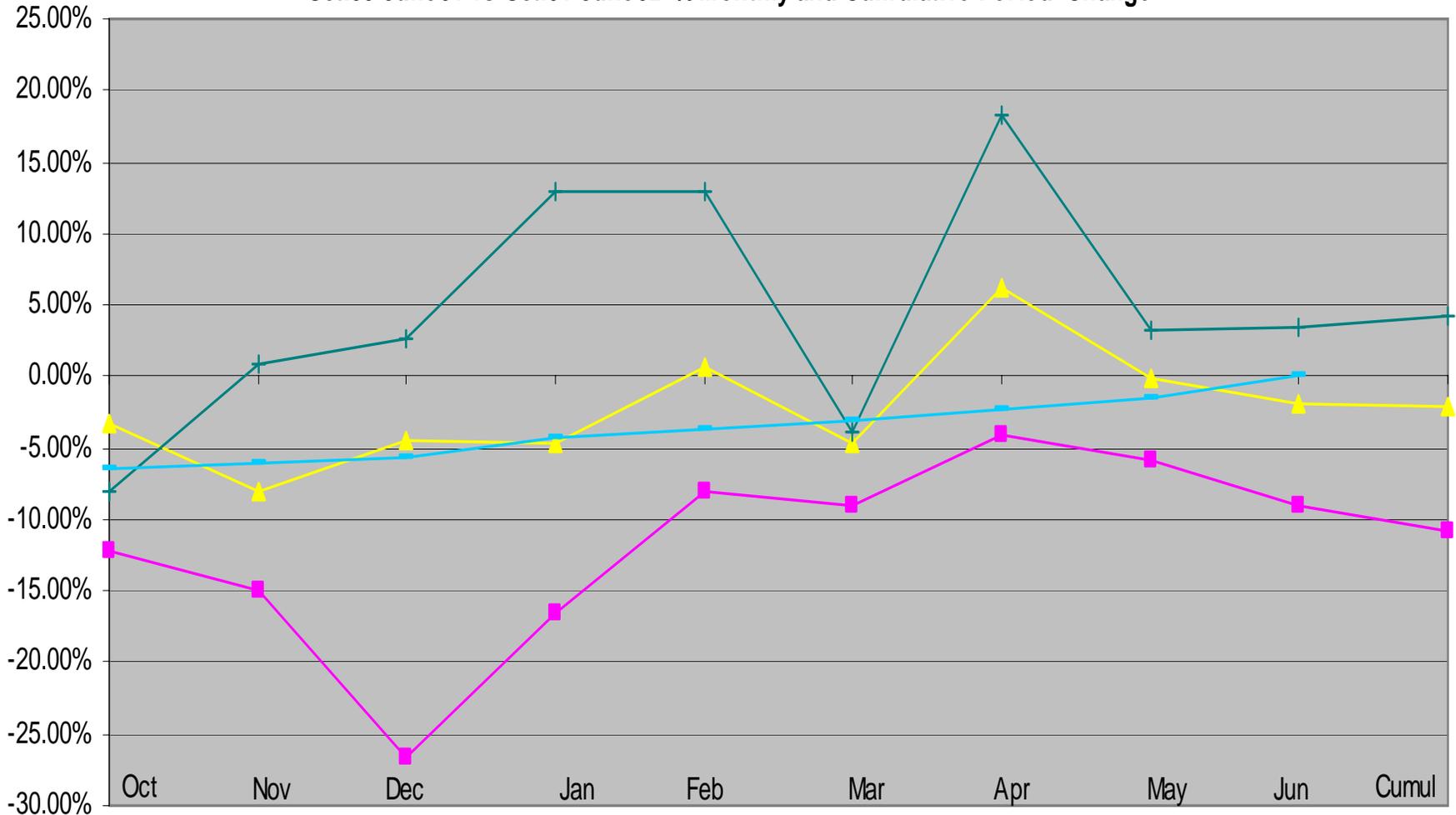
Auto Production (units)		Industrial Production Stats	
USA	Canada	US Production	Canada Production
1,155,915	249,397	152	107.8
963,165	252,663	151.2	108.6
774,789	177,315	150.1	107.9
875,076	218,381	148.9	107.5
892,603	218,680	148.4	107.9
1,092,539	241,779	147.9	108.5
970,092	226,102	146.7	108.9
1,152,429	248,246	146.4	109.4
1,030,827	238,319	145	108
8,907,435	2,070,882	*	*
1,069,324	215,293	142.1	106.4
971,437	237,179	142	106.3
795,991	162,437	141.6	105.3
987,449	196,453	142.6	106.3
1,007,684	232,833	142.9	106.7
1,050,665	227,544	143.4	107.4
1,146,728	258,786	143.4	107.6
1,188,753	252,335	144.2	106.9
1,067,253	237,511	145	106.7
9,285,284	2,020,371	*	*

TOTAL U.S. - CANADA
 PRE 9/11 OCT00 TO JUNE 01 VS. POST 9/11 OCT01 TO JUNE 02
 COMPARISON OF ECONOMIC ACTIVITY, LAND BASED TRADE LEVELS, AND TRUCK ACTIVITY
 COMPARISON OF % CHANGE LEVELS FROM PRE 9/11 TO POST 9/11 BY MONTH AND CUMULATIVE

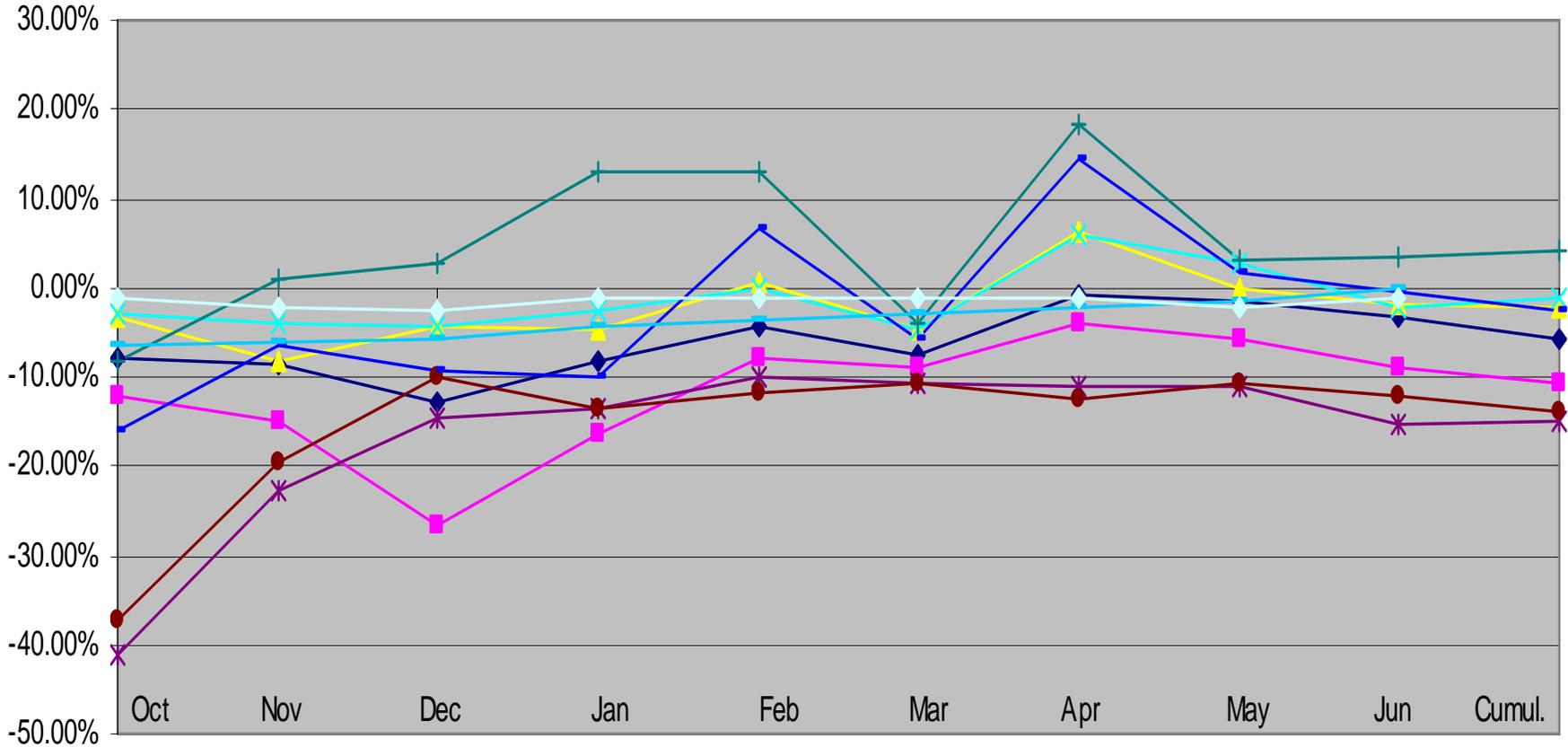
TIME PERIOD	LAND TRADE DATA		INCOMING U.S. TRAFFIC		INCOMING CANADA TRAFFIC	
	Canadian Exports (to US)	US Exports (to Canada)	Trucks	Personal Vehicles	Trucks	Personal Vehicles
	October-00 vs. October-01	-12.28%	-7.72%	-3.23%	-41.21%	-3.04%
November-00 vs. November-01	-15.02%	-8.59%	-8.11%	-22.85%	-3.81%	-19.53%
December-00 vs. December-01	-26.60%	-12.93%	-4.39%	-14.74%	-4.24%	-10.14%
January-01 vs. January-02	-16.50%	-8.40%	-4.63%	-13.60%	-2.64%	-13.64%
February-01 vs. February-02	-8.00%	-4.31%	0.58%	-10.03%	-0.20%	-11.75%
March-01 vs. March-02	-9.10%	-7.41%	-4.72%	-10.79%	-4.56%	-10.77%
April-01 vs. April-02	-4.08%	-0.63%	6.12%	-11.01%	6.07%	-12.32%
May-01 vs. May-02	-5.89%	-1.56%	-0.05%	-10.91%	2.73%	-10.62%
June-01 vs. June-02	-9.09%	-3.29%	-1.96%	-15.47%	-2.37%	-12.28%
9-month % change	-10.83%	-5.69%	-2.19%	-14.98%	-1.28%	-13.91%

USA	Canada	US Production	Canada Production
-8.10%	-15.84%	-6.51%	-1.30%
0.85%	-6.53%	-6.08%	-2.12%
2.66%	-9.16%	-5.66%	-2.41%
12.84%	-10.04%	-4.23%	-1.12%
12.89%	6.47%	-3.71%	-1.11%
-3.83%	-5.89%	-3.04%	-1.01%
18.21%	14.46%	-2.25%	-1.19%
3.15%	1.65%	-1.50%	-2.29%
3.53%	-0.34%	0.00%	-1.20%
4.24%	-2.44%	3.66%	1.53%

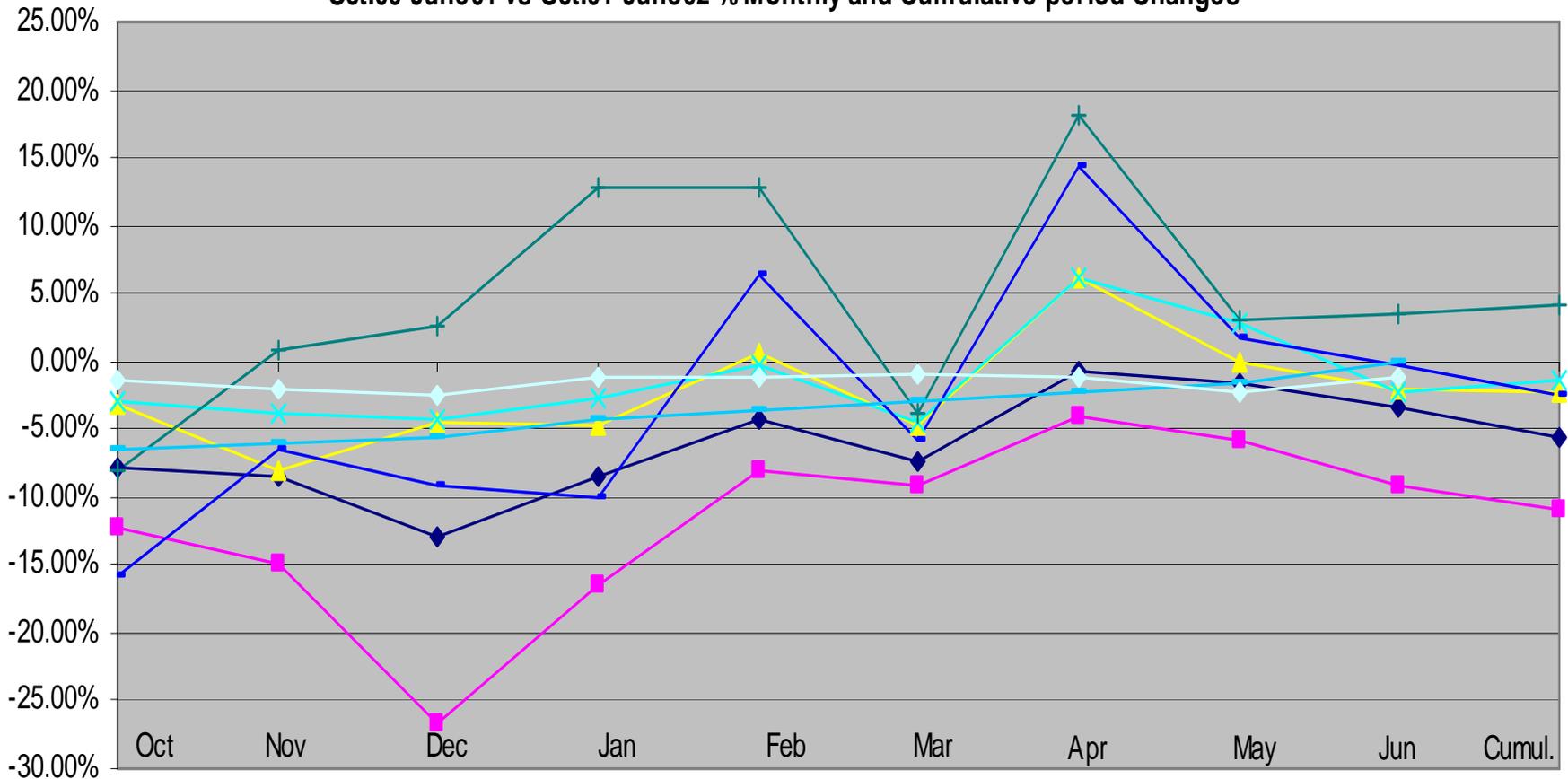
**Total U.S. - Canada - U.S. Economic Activity, Canadian Land Exports to U.S. and Trucks In
Oct.00-June01 vs Oct.01-June02 % Monthly and Cumulative Period Change**



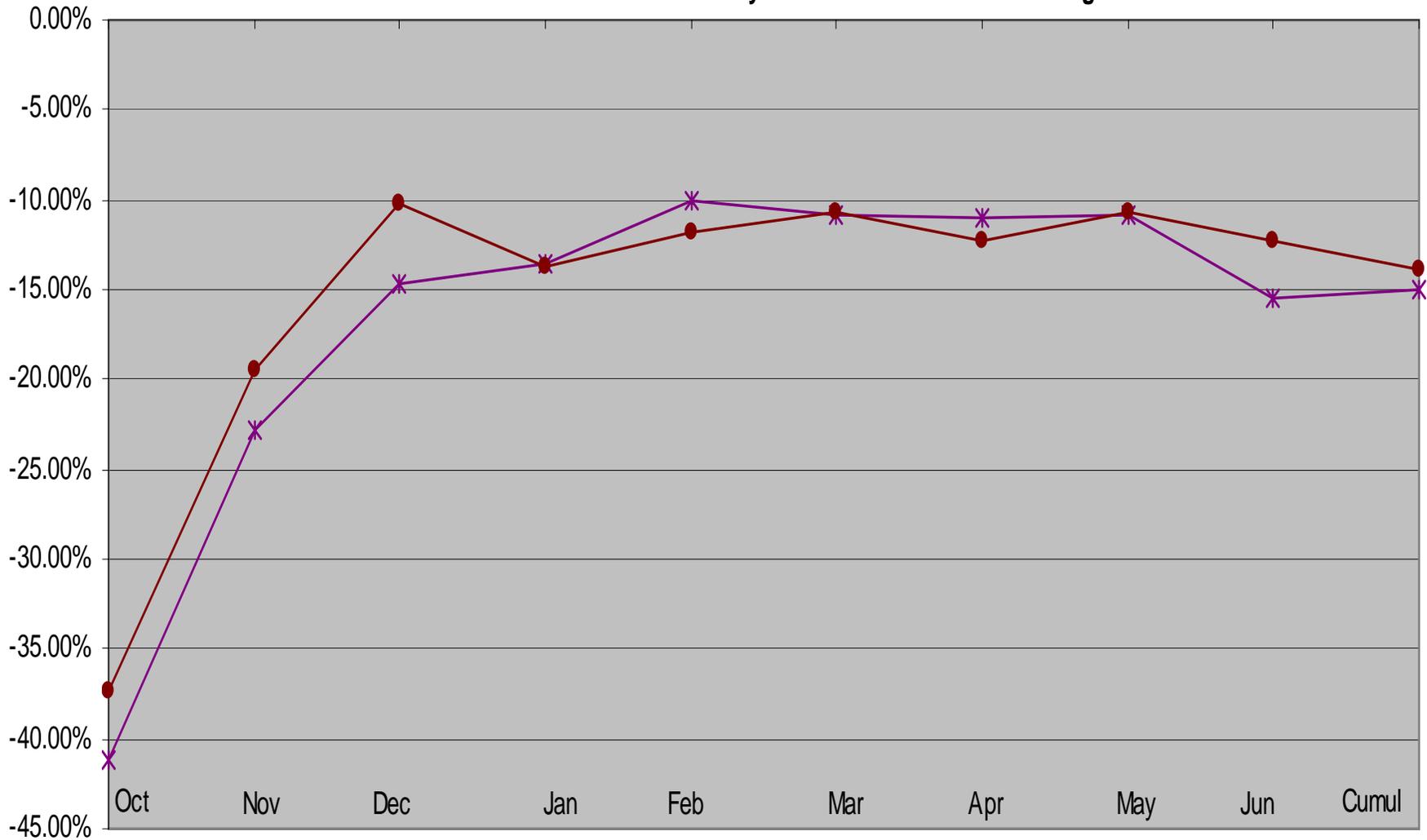
Total U.S.-Canada Economic Activity, Land Based Trade and Traffic
Oct.00-June01 vs Oct.01-June02 % Monthly and Cumulative Period Changes



Total U.S. - Canada Economic Activity, Land Based Trade, and Commercial Traffic
Oct.00-June01 vs Oct.01-June02 % Monthly and Cumulative period Changes

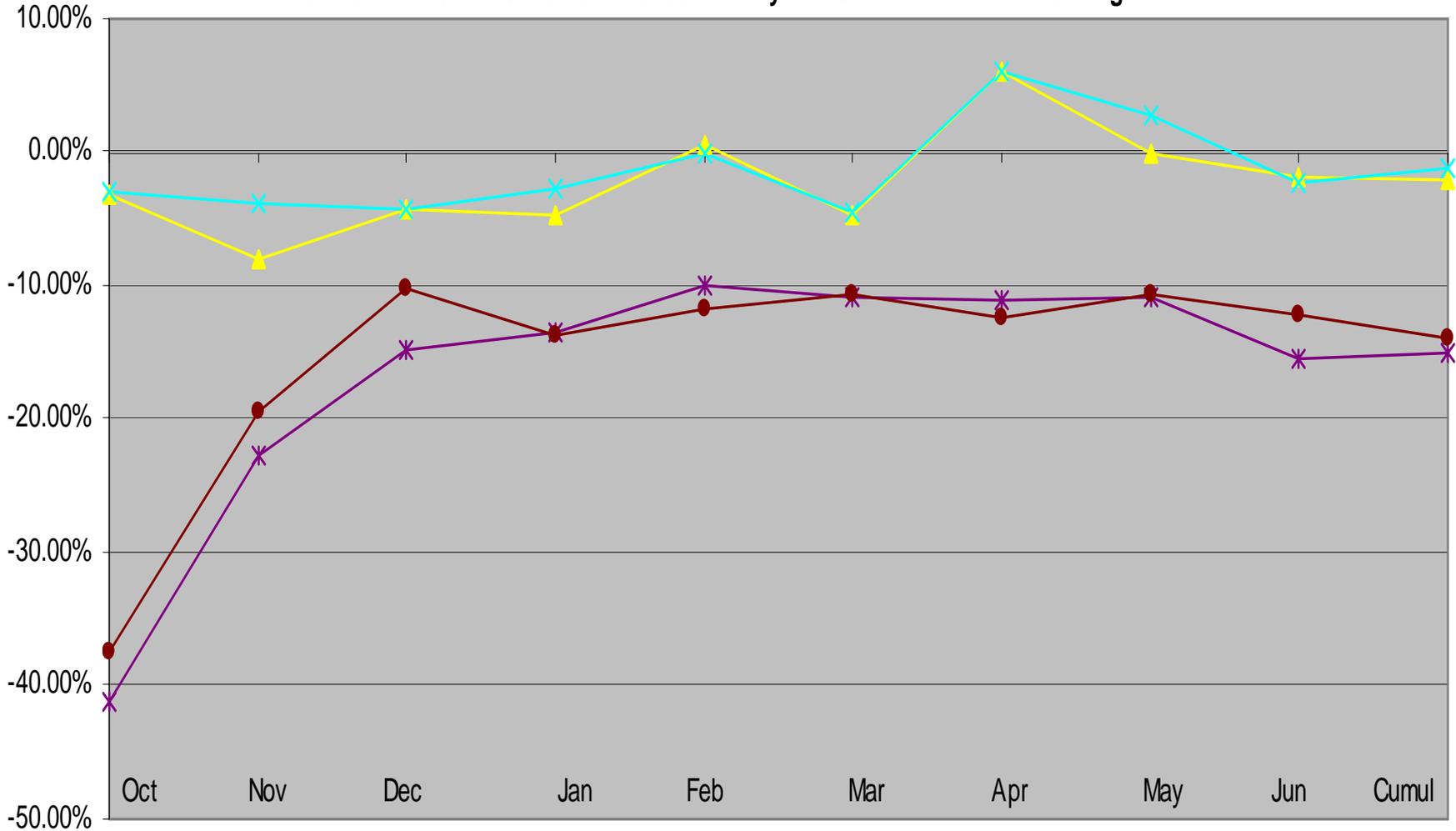


Total U.S. - Canada Personal Vehicle Traffic
Oct.00-June01 vs Oct.01-June02 % Monthly and Cumulative Period Changes

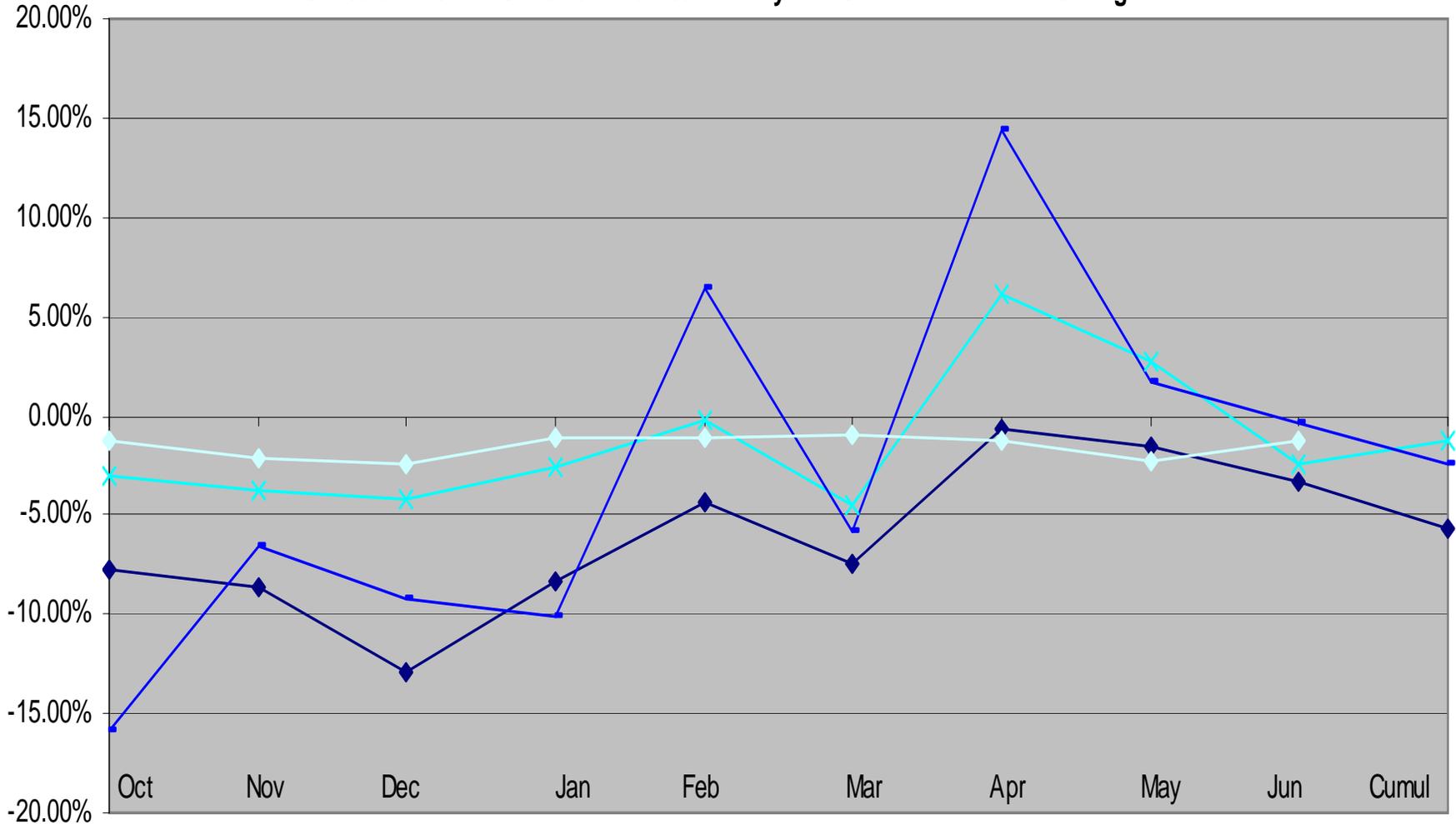


—*— Incoming US - PV —●— Incoming Canada - PV

Total U.S. - Canada Truck and Personal Vehicle
Oct.00-June01 vs Oct.01-June02 % Monthly and Cumulative Period Changes



**Total U.S. - Canada - Canadian Economic Activity, U.S. Land Exports to Canada and Trucks In
Oct.00-June01 vs Oct.01-June02 % Monthly and Cumulative Period Changes**



◆ US Land Exports
 ✖ Incoming Canada-Trucks
 ■ Canada - Auto Production
 ◆ Canada Indust. Prod.

Appendix V
Immediate Post 9/11
Impacts

Immediate Post 9/11 Costs September-December, 2001

- While the increases in transit time resulting from 9/11 were extensively reported, the worst of those impacts lasted for just a few days to one week.
 - While the really long transit times of 20-24 hours or so for trucks and 10-16 hours for cars lasted just a few days, transit times far in excess of what had ever been experienced in the past went on for several weeks.
 - These transit times were down to a more typical 2 hours for trucks, and 1 hour or so for cars after the first week and slowly improved through the October to December period.
- In the following pages the impact on personal vehicle travelers and trucks are separately reviewed.
- Impacts ranged from those relating to the actual transit time and the uncertainty related to these transit times, to effects on manufacturing and various service businesses.

Immediate Post 9/11 Costs September-December, 2001

Personal Traveler Impacts for Entry to U.S.

- Auto transit times were 10-16 hours in the first few days and then dropped off to an average of 1 hour for a few weeks in late September before reaching the monthly transit time estimates shown below.
- However, while the transit times dropped fairly quickly in the weeks following 9/11, there continued to be a great deal of variability in actual crossing times, and a great deal of perceived uncertainty about actual crossing times.
 - During the September – December time period, it was not uncommon for there to be fairly normal crossing times even at peak periods on a given day, but for times to be very elevated the next day at the same time. This variability was due primarily to issues related to the number of open primary inspection booths, and the federal inspection service (FIS) processing times per car on a given day.
 - The uncertainty issue was exacerbated up and down the border by a lack of good real time information for travelers. While public web pages and radio reports were increased, these reports were often too late to reflect actual conditions when they were reported, and often were not as accurate as needed.
- While there were some increases in transit times for entry to Canada, these were not as extensive and did not last for as many days. As such our analysis of total transit times focuses on entry to the U.S.

Immediate Post 9/11 Costs September-December, 2001

Personal Traveler Impacts for Entry to U.S.

- During the October-December period, the 6.58 million vehicles entering the U.S. encountered an estimated 1.79 million hours of transit time with an estimated cost of US\$17.9 million.
- Based on Canada Customs archived data on entries to the U.S. transit times (backup time) averaged an estimated 23 minutes in October, 18 minutes in November, and 8 minutes in December. While the November-December period is based on actual data, the October transit times are imputed based on the November – December data.
- An hourly cost of US\$10/hour was assumed based on rates used in other FHWA sponsored reports.
- Perhaps the clearest measure of the impact of these long transit times can be found in the data on the number of vehicles entering the U.S. during the October – December time period compared to the prior year. During this time period auto traffic border-wide was down as follows:
 - October - 41.2%
 - November - 22.9%
 - December - 14.7%

Immediate Post 9/11 Costs September-December, 2001

Personal Traveler Impacts for Entry to U.S.

- Decreases in auto traffic had a major impact on the border community tourism industry related to hotels, restaurants, and entertainment. These tourism impacts were especially severe on the Canadian side of the border where a number of Canadian border cities have built up extensive tourist destinations that cater to American travelers. For instance, some Windsor and Niagara businesses reported customer volumes being down as much as 70% due to the loss of American customers. Other indications of impact include the following:
 - A survey by the Windsor Chamber of Commerce found that in the weeks following 9/11 Windsor businesses lost “C\$10’s of millions of dollars,” with 71% of businesses saying they were “hurt” by border delays and 60% saying it was “severe.”
 - The Windsor City Centre Entertainment District reported that their members had laid off 900 employees in the month following 9/11.
 - A report indicating Windsor restaurant business was down C\$3 million per week.
 - A report that Toronto theatres lost C\$400,000 in revenue in the week following 9/11.
 - A report that Toronto hotel occupancy was down 40% in the week following 9/11 due to difficulty in Americans traveling.
 - Niagara tourism business was also reported to be down 50% in the weeks following 9/11.
 - A 25% drop in Casino Windsor cross-border traffic over 4 months.

Immediate Post 9/11 Costs September-December, 2001

Personal Traveler Impacts for Entry to U.S.

- Other personal traveler impacts included:
 - Reports of recreational hockey players having to leave for cross-border games 90 minutes earlier than normal, forcing time off from work.
 - A dramatic reduction in the number of Windsorites attending Red Wing hockey games in Detroit.
 - Windsor students attending Wayne State University in Detroit missing classes for several weeks due to long waits.
 - Cancellation of the Detroit–Windsor marathon crossing the border.
- The longer transit times also had a major impact on Canadian commuters crossing the border for jobs in the U.S. For instance, in the Windsor-Detroit area commuters experienced a number of problems. Some 6,000 Windsorites a day cross the border for U.S. jobs, many of them at Detroit area hospitals. During this period a number of hospitals reported problems with missed shifts, and had to arrange special transportation for their employees.
- For commuters, a very small increase in transit time, and uncertainty over that transit time, can be sufficient to make a cross-border job impractical. During the project we interviewed several workers that were considering job changes to avoid the cross border commute because they were having to leave home an hour earlier than normal to make sure they arrived at work in time.

Immediate Post 9/11 Costs September-December, 2001

Carrier Impacts for Entry to U.S.

- Truck primary inspection transit times in mid September averaged 20-24 hours for a few days and then dropped to an average of 2 hours for several weeks based on anecdotal and newspaper accounts. Newspaper reports suggest that transit times were as high as 25 hours in some locations for a few days after 9/11. However, following the initial few weeks transit times dropped considerably, but with a great deal of variability.
- During the October-December period, the 1.62 million trucks entering the U.S. encountered an estimated .334 million hours of primary inspection transit time (backup time) with an estimated cost of US\$50.1 million.
- Based on Canada Customs data on entries to the U.S., primary inspection transit times averaged an estimated 16 minutes in October, 12 minutes in November, and 8 minutes in December. October transit times are imputed based on November-December data and anecdotal information for October. Cost of \$150/hour assumed based on rates used in FHWA sponsored reports. See Maring and Lambert, "Freight Analysis Framework," FHWA.

Immediate Post 9/11 Costs September-December, 2001

Carrier Impacts for Entry to U.S.

- Given these transit times from Canada, and the uncertainty, truck traffic border-wide entering the U.S. was down as follows compared to the same month in the prior year:
 - October 3.2%
 - November 8.1%
 - December 4.4%
- According to several sources that were interviewed, one reason for the reduction in the number of trucks was an increase in consolidation so that less trucks would be needed.
- During this period, carriers also encountered a far greater level of secondary yard processing time than is normally the case. Based on interviews, it is estimated that an average of 50% of all trucks entered secondary during this time period, and that they averaged 2 hours in secondary.
 - Given the 1.62 million trucks that entered the U.S. during this quarter, and a 50% secondary rate, 2 hour processing time, and US\$150/hour cost, the total secondary processing time cost impact is estimated at US\$243 million.
- The overall result was, according to the Ontario Trucking Association, a cost of C\$1 million per hour in additional carrier costs during a few weeks after 9/11.

Immediate Post 9/11 Costs September-December, 2001

Auto Industry Shutdown and Inventory Impacts

- While it was not possible to calculate impacts for the entire manufacturing industry in this immediate post 9/11 period, the following is an estimate of impacts on the very cross-border integrated North American auto industry.
- For the auto industry, total transit times (primary and secondary) of more than an hour begin to cause supply disruptions, beginning with schedule adjustments and extending to the extreme of plant shutdowns according to the Center of Automotive Research (CAR) in Ann Arbor, Michigan. Given the large number of above normal transit times of over an hour during the 4th Qtr of 2001, it is easy to understand why plant shutdowns and other disruptions occurred during this quarter.
- In the immediate post 9/11 period a number of manufacturing plants were indeed forced to shut down for a lack of parts. In the automotive industry these shutdowns lasted from a half day to several days and occurred on both sides of the border. The costs of auto assembly plant shutdowns average US\$60,000 per hour in lost profits according to CAR. Similar costs for a major component manufacturing facility average US\$7,500 per hour.

Immediate Post 9/11 Costs September-December, 2001

Auto Industry Shutdown and Inventory Impacts

- We estimate that in the immediate post 9/11 period there were some 150 hours of assembly plant shutdowns at major auto companies, with an estimated US\$9 million in lost profits. While it is impossible to tell how many hours Tier 1 and other suppliers might have had to shut down, they probably exceeded the shutdowns of Big 3 automotive assembly plants.
 - For instance, Delphi Automotive is quoted as having lost some US\$10 million from September 11-30 as it worked to cobble together its just-in-time supply chain.
- Inventory levels also crept up for several months following 9/11. Most auto companies, including the “Big 3,” increased Canadian component inventories by several hours following 9/11. Such inventories typically average 48 hours worth of production.
- The U.S. imports US\$12.7 billion in Canadian component inventory per year, and given the typical 2 days supply, achieves 180 turns per year. With an added 4 hours of inventory in the system, this represents an 8% increase, taking inventory turns from 180 down to 166. This results in average inventories of Canadian components increasing from \$70 to 77 million, or an increase of US\$7 million. (continued)

Immediate Post 9/11 Costs September-December, 2001

Auto Industry Shutdown and Inventory Impacts

Such an increase in inventory, assuming an Inventory Carrying Cost (ICC) of 12%, would result in a US\$.84 million increase in annual ICC or P & L expenses. This would translate to US\$.21 million in additional expense for the quarter following 9/11. A fairly minimal impact.

- While limited to a few weeks, one report suggested Daimler-Chrysler increased its inventory levels by 8-12 hours of supply for 150 key suppliers (although many were in-country suppliers).
- Perhaps more importantly, the uncertainty over border delays can throw off the balance on returnable container assets used in the auto industry. Most supply chains have just enough of these containers to support production given an assumed number of cycles per day. If less cycles occur, this can result in suppliers running out of containers and disrupting the ability to provide scheduled quantities of components.

Appendix VI
Macro Level
Border Impact Indicators

Macro Indicators of Cost Impacts

Annual Costs Based on Summer 2002 Observations

- Before studying specific categories of cost impacts and estimating their costs, the research team wanted to examine any macroeconomic level indicators of border crossing costs.
- There are several broad macro level approaches to estimating the overall border-wide cost impact of border crossings and delays.
- These approaches include:
 - the degree to which freight rates are higher on cross-border moves compared to similar domestic moves.
 - estimates of the typical time built into routes crossing the border.
 - Overall reductions in traffic levels and their impact.
- The following slides provide estimates of border costs using these approaches and offer estimates ranging from the low end, to a mid-level, to an upper end in each case.
- The mid-level estimates for two of these approaches are as follows:
 - Cross-Border Rate/Cost Penalty \$US1.590 Billion
 - Route Buffer Border Time \$US2.004 Billion

Macro Indicators of Cost Impacts

Annual Costs Based on Summer 2002 Observations

- These costs can be compared to the total costs arrived at later in the report based on looking at various categories of detailed cost impacts by key crossing and in total.
- Macro level tourist data also is included in this section but total expenditures were generally flat from 2nd qtr 01 to 02 with little net impact on a national level. However, same day American expenditures in Canada were down \$C45 (US\$30) million for the 2nd qtr. of 2002 compared to the prior year.
- This reduced spending would have had a significant impact in Canadian border communities.

Cross-Border Freight Rate/Cost Penalty

- Cross-border freight charges in constant US\$ terms are considerably higher than comparable distance and demand characteristic domestic rates.
- These higher rates are due primarily, given extensive competition among carriers, to higher costs for cross-border routes.
- On the next slide the details of cross-border rate penalty calculations are shown. These calculations start with the level of trade and assume a typical domestic freight rate and then apply a cross-border % rate premium to arrive at the penalty cost for cross-border shipments.
- For domestic freight costs as a % of sales, a figure of 3.34% was assumed- the freight cost as a % of sales for all modes of transportation in the U.S. according to the Herbert W. Davis (management consultants) database. However, this percentage was increased somewhat to reflect the fact that truck costs are higher than overall transportation costs, and to reflect the fact that much of the cross-border trade is intra-company at transfer prices that are well short of sales price – the basis of the Davis numbers.
 - Given the above points, domestic rates of 4.0, 4.5, and 5.0% were used for the three scenarios.

Cross-Border Freight Rate/Cost Penalty

- The midrange assumption of a 15%% penalty in cross-border rates is based on an interview with the Freight Carriers Association of Canada (the old Niagara Rate Bureau).
 - For the lower end estimate a rate penalty of 10% was assumed.
 - For the high end this has been increased to 20% to reflect several interviews with carriers suggesting that cross-border rates are actually 15-30% higher than comparable domestic ones in constant US\$ terms (in other words, exchange rate differences are taken into account). It is assumed that these penalty costs can be applied to both for-hire and private traffic because they are due to cost penalties cross-border whether or not they are actually passed on in a published rate structure.
- Given these assumptions, it is estimated that the penalty cost for cross-border freight ranges from US\$.940B to US\$2.35B with a mid-range estimate of US\$1.59B.

Cross-Border Freight Rate/Cost Penalty (Billions of US\$)

<u>Assumption</u>	<u>Minimum</u>	<u>Middle</u>	<u>Maximum</u>
2001 US\$ Trade by Truck	\$235B	\$235B	\$235B
Domestic Freight Cost as % of Sales	4.00%	4.50%	5.00%
Freight Cost at Domestic Rates	\$9.40B	\$10.58B	\$11.75B
% by Which Cross-Border Exceeds Domestic Rates	10%	15%	20%
Cross-Border Incremental Freight Cost	\$.940B	\$1.59B	\$2.35B

Cross-Border Surcharges/Carrier Costs

- Another indication of macro border crossing costs can be found in the various surcharges for the border. Several carriers that do extensive cross-border volume have a surcharge in their cross-border rates. These are primarily LTL carriers and include the following:
 - Reimer/Roadway \$20 surcharge per consignment on truck
 - Con-way \$8 surcharge per shipment
 - Kindersley Transport Amount not known
- Others charge more if the importer does not have some form of line release.
- Several LTL carriers also indicated consignees will often come across the border and pick up freight at the carriers terminal on the other side of the border in order to avoid higher cross-border charges and to speed delivery.
- Most tariffs also provide for “wait time” in Customs secondary yards to be charged to the party paying the freight. Canadian carriers have recently talked about adding to this, the time waiting to get up to Customs (backup time). Examples of carriers that charge back when possible include:
 - Liberty Trucking (when possible)
 - Overland (difficult though if 20-30 consignments)

Cross-Border Surcharges/Carrier Costs

- Several carriers have also talked about their border crossing related costs and include:
 - Con-way - \$15-20M cost increases since 9/11 for more time to cross border, tying up more equipment, and investment in systems to meet new security requirements.
 - LTL Carrier - Estimate that border costs are 2% of total cost structure on cross-border moves.
 - Reimer - Has offices at each major crossing and estimates costs at \$C4 million at a minimum.

Time Cost Built Into Route Assumptions

Bi-directional Total Costs

- Another macro indicator of border related cost is the time carriers build into their route planning assumptions, regardless of how long crossings may actually take.
- Third parties and carriers routinely plan a level of border crossing time in order to be able to plan routes, determine the number of trucks that will be needed to move a given amount of freight, and to assure drivers remain within hours of service regulation requirements.
- If carriers plan a given amount of time, but the trip takes less time, they in effect incur the planned amount of time and cost because they have already committed to a given route structure and number of trucks to move the freight.
- At least for a large percentage of movements, if the route takes less time than planned, it is not possible to re-deploy the truck for any productive benefit. In the calculation slide that follows it is assumed that a range of 40-60% of carriers do this kind of route planning and can not benefit if less time is actually used.

Time Cost Built Into Route Assumptions

Bi-directional Total Costs

- For cross-border moves, third parties and carriers have fairly uniformly indicated in interviews that they plan for 2 hours of border crossing time regardless of how long it actually takes. However, several manufacturers, private fleet operators and for-hire carriers told us of situations where they build in 4-5 hours for border time because of penalties which apply if they miss delivery windows at, for instance, a Wall-Mart distribution center.
- Based on a cost per hour of \$150, it is estimated that the macro route planning impact of border crossing transit times and uncertainty is in the range of US\$1.203B to US\$2.406B with a midrange estimate of US\$2.004B as shown on the next slide.

Time Cost Built Into Route Assumptions

Bi-directional Total Costs

Billions of US\$'s

<u>Assumption</u>	<u>Minimum</u>	<u>Middle</u>	<u>Maximum</u>
No. of Trucks Crossing Border	13366	13366	13366
% Subject to Route Planning	40%	50%	60%
No. of Trucks Affected	5346	6683	8020
Average Route Time Planned for Border	1.5 Hours	2.0 Hours	2.0 Hours
Total Hours of Planned Border Time	8019	13366	16040
Cost per Hour	\$150/Hr	\$150/Hr	\$150/Hr
Total Border Crossing Planned Time	\$1.203B	\$2.004B	\$2.406B

Macro Tourism Impacts on Local Border Economies

- On the personal traveler side, the macro impact of extended transit times and uncertainty, and the resulting reduction in travelers, can be estimated using Statistics Canada data. This summary of traveler information should be of considerable interest to tourism professionals.
- The following discussion is based on Statistics Canada traveler data for 2nd qtr 2001 vs. 2002 as shown in the following table and bar charts.
- Total person trips were down 2.3 million for the quarter, or 10.6% from 2001 to 2002.
- Same day travel represented 73.6% of all trips in 2001 but fell to 69.6% of the total in 2002 – a drop-off of 15.1%.
- Returning Canadians represented a steady 53.6% of total cross-border travelers with Americans representing the remaining 46.4%.
- Within the same day category, in 2002 returning Canadians represented 55.6% of the person trips, compared to just 44.4% for Americans traveling to Canada – with the American travel down 16.7% from 2001.
- Returning Canadians spent an average of C\$142.10 in the U.S. while Americans planned on spending an average C\$152.00 in Canada. Americans planning same day stays planned on spending C\$55.04 in Canada while those planning on 1+ night stays planned on spending C\$341.80.

Macro Tourism Impacts on Local Border Economies

- Interestingly, in the 2nd qtr, total spending by Canadians in the U.S. and by Americans in Canada stayed virtually unchanged at C\$1.42B and C\$1.36B respectively. This was true despite the substantial drop in same day person trips, apparently because of the much higher dollars spent on 1+ night trips and some increase in such trips which more than offset the falloff in relatively low spending same day trips.
- During 2002 10.3% of all person trips by Canadians were for work related purposes, while 7.0% of all trips by Americans were for work purposes. In both cases trips for holiday/vacation/visit friends dominated as a trip reason.
- The conclusion from this data is that there was little macro impact at the national level in terms of total spending levels pre 9/11 to post 9/11, primarily because the increase in 1 night plus trips with high levels of spending more than offset the reduction in relatively low spending same day trips.
- However, while there was little impact at the national level, the reduction in same day trips and related spending is of major importance to border communities in Canada. While data is available on spending by crossing, time and budget for this study did not allow its purchase.

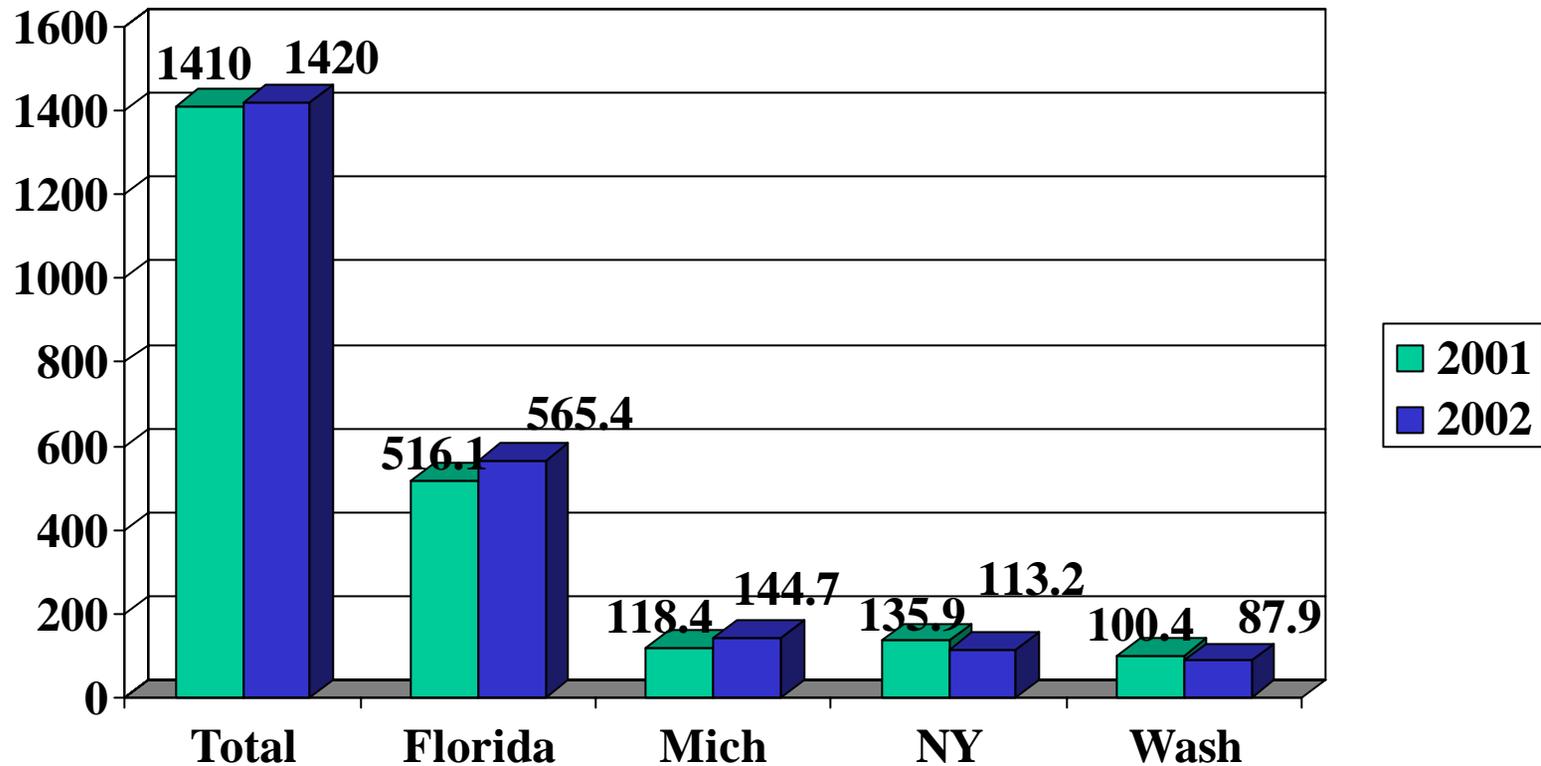
Personal Traveler Person Trips Data

2nd Qtr 2001 vs. 2002

Trip Type Nationality/Year	2001 (Millions)	Within 2001% 's	2002 (Millions)	Within 2002% 's	2001/2002 % Change
Same Day/Rtng Canadians	8.7	54.7%	7.5	55.6%	-13.8%
Same Day Amer to Canada	<u>7.2</u>	<u>45.3%</u>	<u>6.0</u>	<u>44.4%</u>	<u>-16.7%</u>
Same Day Total	15.9	100.0%	13.5	100.0%	-15.1%
1+ Night Rtng Canadians	2.9	50.0%	2.9	49.2%	0.0%
1+ Night Amer to Canada	<u>2.9</u>	<u>50.0%</u>	<u>3.0</u>	<u>50.8%</u>	<u>3.4%</u>
1+ Night Total	5.8	100.0%	5.9	100.0%	1.7%
Total Rtng Canadians	11.6	53.5%	10.4	53.6%	-10.3%
Total Amer to Canada	<u>10.1</u>	<u>46.5%</u>	<u>9.0</u>	<u>46.4%</u>	<u>-8.9%</u>
Total Visitors by Nationality	21.7	100.0%	19.4	100.0%	-10.6%
Total Same Day	15.9	73.3%	13.5	69.6%	-15.1%
Total 1+ Night	<u>5.8</u>	<u>26.7%</u>	<u>5.9</u>	<u>30.4%</u>	<u>1.7%</u>
Total Visitors by Trip Length	21.7	100.0%	19.4	100.0%	-10.6%

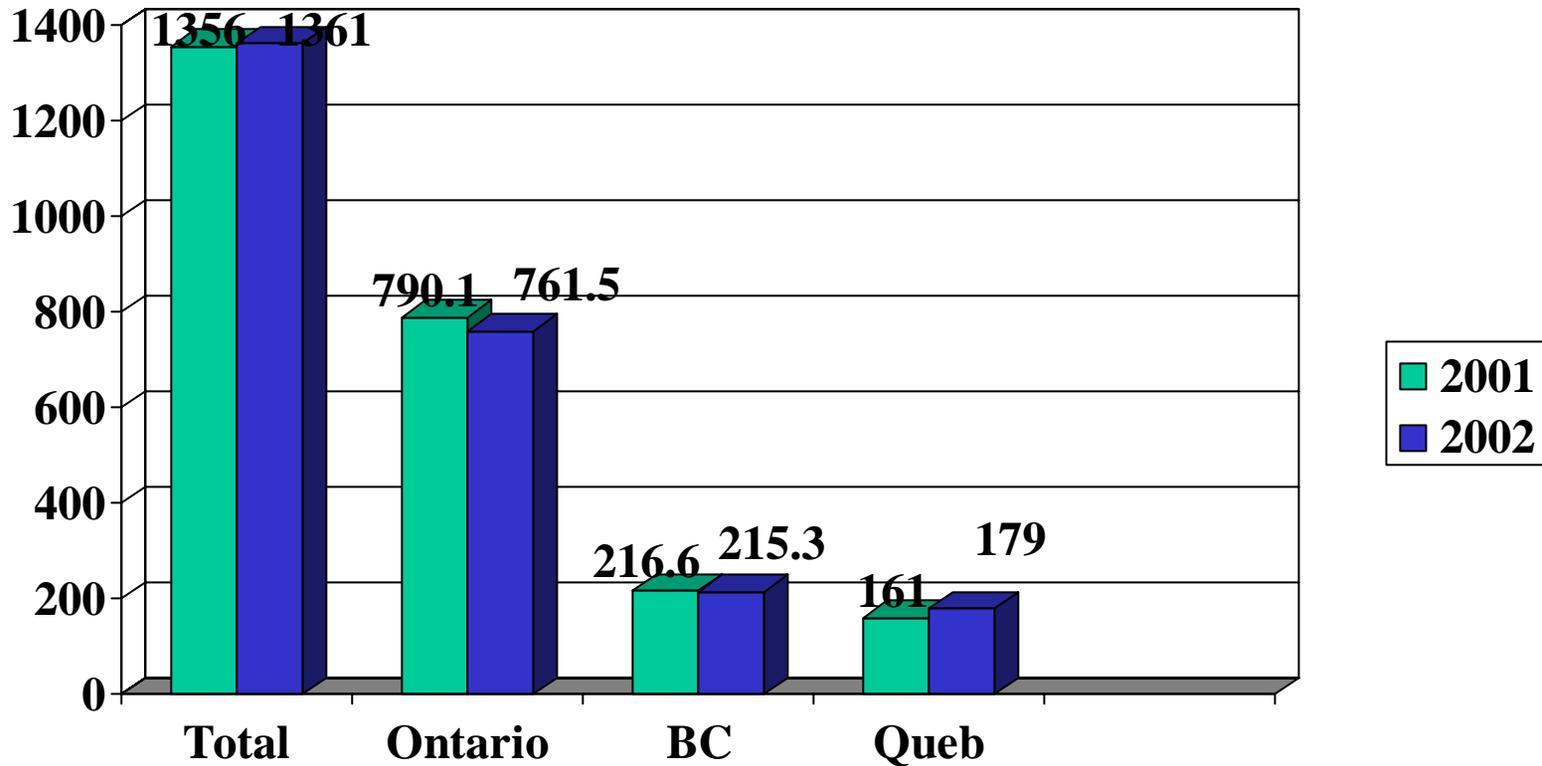
Spending In USA By Canadians

2nd qtr 2001 vs. 2002
(Millions of Canadian \$)



Spending In Canada By Americans

2nd qtr 2001 vs. 2002
(Millions of Canadian \$)



Appendix VII
Detailed Primary Inspection Transit
(Backup) Time Estimates

Primary Inspection Transit Time Data

- One of the key objectives of the research was to estimate the level of primary inspection transit time (backup time), and to estimate the cost impact of this transit time.
- While the research team collected extensive information on primary transit time in interviews, from some delay logs kept by personal travelers and carrier drivers, and from personal observations, it was very difficult to generalize from this data.
- In order to find a generalizable set of data, it was important to have constant day by day readings of transit time over a long period of time. This is especially important because of the extreme variability in border crossing times. Observations in detail for one or two days, as has often been done in individual border crossing studies, is simply not a long enough period for validity given the variability.
- It was also important to find one set of data that covered transit time into the U.S., and into Canada, and that addressed both personal travel in autos and commercial truck traffic.
- Fortunately, a never before used set of transit time data that met the above conditions was discovered during the secondary research phase of the project. This data has been collected by Canada Customs since soon after 9/11 and was made available to the research team by crossing by day for the entire time period since it began being collected.

Primary Inspection Transit Time Data

- The data provides primary inspection transit time estimates for commercial and personal vehicles traveling both into Canada and into the U.S. for each of 20 some key crossings.
- The delay estimates are made by Canada Customs personnel in real time and recorded at each major crossing 6 times per day from early AM to late PM.
- This data has been obtained, manipulated and analyzed for mid – November, 2001 to August 30, 2002. Data has been summarized by time of day and by month. Average delays have been calculated as well as number of incidents of various lengths.
- For purposes of calculating ongoing detailed primary inspection transit times, the period from May 1, 2002 – August 30, 2002 was used. This time period reflects a time well after 9/11 and is believed to reflect the kinds of transit times that were occurring throughout 2002.
- For each major crossing and for “all other crossings” this data is being used to determine average primary inspection transit times by crossing. These sample values are then multiplied times the annual volume of vehicles to arrive at an estimate of total primary inspection transit time and then multiplied times an average cost per hour to obtain dollar cost impact.

Primary Inspection Transit Time Data

- It is important to note the difference between primary inspection transit time for cars and trucks, and secondary yard processing time for trucks. At each crossing, vehicles first line up to clear primary inspection booths. In the case of trucks a percentage (from 20-40%) must also enter secondary to complete processing with Customs, and/or to complete paperwork with brokers.
 - The one exception to this process is for truck entry to the U.S. at western land crossings, where trucks that need to enter secondary first park in Canada, and then walk across the border into the U.S. to visit brokers, and then return to Canada to enter their trucks and drive up to secondary. This point is very important because when truckers are interviewed about crossing times at these crossings, they often state that the crossing time was, say one hour. This is often assumed to mean “primary transit time” in terms of the typical process at all other crossings but in fact includes the secondary yard time. Researchers must be very careful in interpreting these transit time estimates and separating the two components. Fortunately, the Canada Customs primary inspection transit time data does indeed consider only the actual transit time for entry to the U.S. at these western crossings.
- The transit times reported here represent a minimum level because not all hourly checkpoints have data and it appears the estimates are somewhat on the low side based on comparing our observations to reports in the archive.

Primary Inspection Transit Time Data

- The data on primary inspection transit time by crossing is presented at the end of this section.
- The average primary inspection transit times (backup times) for the period of May 1-August 31, 2002, at some 20 key crossings, from 6:00Am-9:00PM, were as follows:
 - Into U.S. – Commercial 10.73 minutes
 - Into U.S. – Personal 9.03 minutes
 - Into Canada – Commercial 4.01 minutes
 - Into Canada – Personal 4.85 minutes
 - It should be noted that these averages are based on observations every 3 hours and represent the time it takes from entering a backup queue until the primary inspection booth is cleared. As such there are many times when there is a zero backup, and a more limited number of incidents with far longer backups. At the same time, there may be backup incidents which continue for several hours which are only recorded once because readings are taken just every 3 hours.
- Average transit times by time of day, and the frequency distribution of backup incidents for each crossing by time of day, and in total, can also be found in the data for each crossing which follows.

Primary Inspection Transit Time Data

- Some of the longest average full day transit times were as follows:
 - Detroit Ambassador - Commercial entering U.S. – 28.82 minutes
 - Pacific Highway - Commercial entering U.S. - 15.09 minutes
 - St. Stephen – Calais - Commercial entering U.S. – 14.04 minutes
 - Lacolle – Champlain - Commercial entering U.S. - 14.20 minutes
 - Sarnia Blue Water - Commercial entering U.S. – 11.69 minutes

 - Blaine Peace Arch - Personal entering U.S. - 22.79 minutes
 - Pacific Highway - Personal entering U.S. - 16.39 minutes
 - St. Stephen – Calais - Personal entering U.S. - 14.05 minutes
 - Detroit Ambassador - Personal entering U.S. - 10.83 minutes

 - Blaine Peace Arch - Personal entering Canada - 10.39 minutes

Primary Inspection Transit Time Data

- Some of the longest specific time of day average transit times were as follows:
 - Detroit Ambassador - Commercial to U.S. 9:00PM - 40.57 minutes
 - St. Stephen - Calais - Commercial to U.S. 3:00PM – 26.12 minutes
 - Pacific Highway - Commercial to U.S. 3:00PM - 23.01 minutes
 - Lacolle- Champlain - Commercial to U.S. 9:00PM – 21.44 minutes

 - Blaine Peace Arch - Personal car to U.S. 6:00PM - 36.68 minutes
 - Pacific Highway - Personal car to U.S. 9:00PM - 27.78 minutes
 - St. Stephen – Calais - Personal car to U.S. 3:00PM - 26.21 minutes
 - Detroit Ambassador - Personal car to U.S. 9:00PM - 16.65 minutes

Canada Customs Primary Trasnit Time Data

St. Stephen, NB - Calais, ME

Total days:	123	Time of day: 6:05				Time of day: 9:05				Time of day: 12:05				
	Date Range:	1-May-02	Commercial Flow		Travellers Flow		Commercial Flow		Travellers Flow		Commercial Flow		Travellers Flow	
		31-Aug-02	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.
Days missing (m):		17	17	17	17	25	25	25	25	22	22	22	22	
Days closed:		0	0	0	0	0	0	0	0	0	0	0	0	
Days with data:		106	106	106	106	98	98	98	98	101	101	101	101	
Total delays mins:		25	330	25	330	85	410	85	410	290	1875	290	1875	
Avg. delay mins:		0.24	3.11	0.24	3.11	0.87	4.18	0.87	4.18	2.87	18.56	2.87	18.56	
Minimum delay:		0	0	0	0	0	0	0	0	0	0	0	0	
Maximum delay:		10	90	10	90	15	60	15	60	45	120	45	120	
Delay <= 30		106	102	106	102	98	96	98	96	100	83	100	83	
Delay 31-60		0	3	0	3	0	2	0	2	1	11	1	11	
Delay 61-90		0	1	0	1	0	0	0	0	0	5	0	5	
Delay 91-120		0	0	0	0	0	0	0	0	0	2	0	2	
Delay >120		0	0	0	0	0	0	0	0	0	0	0	0	
		Time of day: 15:05				Time of day: 18:05				Time of day: 21:05				
		Commercial Flow		Travellers Flow		Commercial Flow		Travellers Flow		Commercial Flow		Travellers Flow		
		Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	
Days missing (m):		20	20	20	20	16	16	16	16	26	26	26	26	
Days closed:		0	0	0	0	0	0	0	0	0	0	0	0	
Days with data:		103	103	103	103	107	107	107	107	97	97	97	97	
Total delays mins:		375	2690	375	2700	140	2350	145	2345	95	1000	95	1000	
Avg. delay mins:		3.64	26.12	3.64	26.21	1.31	21.96	1.36	21.92	0.98	10.31	0.98	10.31	
Minimum delay:		0	0	0	0	0	0	0	0	0	0	0	0	
Maximum delay:		90	150	90	150	15	150	15	150	20	150	20	150	
Delay <= 30		102	75	102	75	107	84	107	84	97	88	97	88	
Delay 31-60		0	13	0	13	0	9	0	9	0	6	0	6	
Delay 61-90		1	9	1	9	0	10	0	10	0	2	0	2	
Delay 91-120		0	5	0	5	0	2	0	2	0	0	0	0	
Delay >120		0	1	0	1	0	2	0	2	0	1	0	1	
		Totals (all times)												
Total delays mins:		1010	8655	1015	8660									
Avg. delay mins:		1.65	14.04	1.66	14.05									
Minimum delay:		0	0	0	0									
Maximum delay:		90	150	90	150									
Delay <= 30		610	528	610	528									
Delay 31-60		1	44	1	44									
Delay 61-90		1	27	1	27									
Delay 91-120		0	9	0	9									
Delay >120		0	4	0	4									

Source: Canada Customs Border Delay Archive Database, September 15, 2002

Canada Customs Primary Transit TimeData Queenston-Lewiston Bridge (ON - NY)

Total days: 123		Time of day: 6:05				Time of day: 9:05				Time of day: 12:05			
Date Range: 1-May-02		Commercial Flow		Travellers Flow		Commercial Flow		Travellers Flow		Commercial Flow		Travellers Flow	
31-Aug-02		Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.
Days missing (m):		17	17	17	17	25	25	25	25	22	22	22	22
Days closed:		0	0	0	0	0	0	0	0	0	0	0	0
Days with data:		106	106	106	106	98	98	98	98	101	101	101	101
Total delays mins:		70	30	100	15	45	35	80	15	95	95	170	140
Avg. delay mins:		0.66	0.28	0.94	0.14	0.46	0.36	0.82	0.15	0.94	0.94	1.68	1.39
Minimum delay:		0	0	0	0	0	0	0	0	0	0	0	0
Maximum delay:		30	20	15	15	20	20	30	15	30	30	30	30
Delay <= 30		106	106	106	106	98	98	98	98	101	101	101	101
Delay 31-60		0	0	0	0	0	0	0	0	0	0	0	0
Delay 61-90		0	0	0	0	0	0	0	0	0	0	0	0
Delay 91-120		0	0	0	0	0	0	0	0	0	0	0	0
Delay >120		0	0	0	0	0	0	0	0	0	0	0	0
		Time of day: 15:05				Time of day: 18:05				Time of day: 21:05			
		Commercial Flow		Travellers Flow		Commercial Flow		Travellers Flow		Commercial Flow		Travellers Flow	
		Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.
Days missing (m):		20	20	20	20	16	16	16	16	26	26	26	26
Days closed:		0	0	0	0	0	0	0	0	0	0	0	0
Days with data:		103	103	103	103	107	107	107	107	97	97	97	97
Total delays mins:		160	150	355	270	320	365	510	360	150	80	180	190
Avg. delay mins:		1.55	1.46	3.45	2.62	2.99	3.41	4.77	3.36	1.55	0.82	1.86	1.96
Minimum delay:		0	0	0	0	0	0	0	0	0	0	0	0
Maximum delay:		45	60	60	90	75	180	75	180	60	20	60	120
Delay <= 30		102	102	102	101	105	106	104	106	96	97	96	96
Delay 31-60		1	1	1	1	1	0	2	0	1	0	1	0
Delay 61-90		0	0	0	1	1	0	1	0	0	0	0	0
Delay 91-120		0	0	0	0	0	0	0	0	0	0	0	1
Delay >120		0	0	0	0	0	1	0	1	0	0	0	0
		Totals (all times)											
Total delays mins:		840	755	1395	990								
Avg. delay mins:		1.36	1.21	2.25	1.60								
Minimum delay:		0	0	0	0								
Maximum delay:		75	180	75	180								
Delay <= 30		608	610	607	608								
Delay 31-60		3	1	4	1								
Delay 61-90		1	0	1	1								
Delay 91-120		0	0	0	1								
Delay >120		0	1	0	1								

Source: Canada Customs Border Delay Arc

**Canada Customs Primary Transit Time Data
Detroit - Canada Tunnel (Detroit, MI - Windsor, ON)**

May 1 - August 31, 2002

Total days:	123		Time of day: 6:05				Time of day: 9:05				Time of day: 12:05				
	Date Range:	1-May-02		Commercial Flow		Travellers Flow		Commercial Flow		Travellers Flow		Commercial Flow		Travellers Flow	
		31-Aug-02		Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.
Days missing (m):	17		17		17	17	25	25	25	25	22	22	22	22	
Days closed:	0		0		0	0	0	0	0	0	0	0	0	0	
Days with data:	106		106		106	106	98	98	98	98	101	101	101	101	
Total delays mins:	45		300		80	370	20	320	55	375	195	595	250	685	
Avg. delay mins:	0.42		2.83		0.75	3.49	0.20	3.27	0.56	3.83	1.93	5.89	2.48	6.78	
Minimum delay:	0		0		0	0	0	0	0	0	0	0	0	0	
Maximum delay:	20		45		20	45	5	60	15	60	25	75	25	75	
Delay <= 30	106		105		106	105	98	95	98	95	101	97	101	97	
Delay 31-60	0		1		0	1	0	3	0	3	0	3	0	3	
Delay 61-90	0		0		0	0	0	0	0	0	1	0	1		
Delay 91-120	0		0		0	0	0	0	0	0	0	0	0		
Delay >120	0		0		0	0	0	0	0	0	0	0	0		
			Time of day: 15:05				Time of day: 18:05				Time of day: 21:05				
			Commercial Flow		Travellers Flow		Commercial Flow		Travellers Flow		Commercial Flow		Travellers Flow		
			Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	Canada	U.S.	
Days missing (m):	20		20		20	20	16	16	16	16	26	26	26	26	
Days closed:	0		0		0	0	0	0	0	0	0	0	0	0	
Days with data:	103		103		103	103	107	107	107	107	97	97	97	97	
Total delays mins:	225		980		250	1060	295	750	390	850	345	535	455	620	
Avg. delay mins:	2.18		9.51		2.43	10.29	2.76	7.01	3.64	7.94	3.56	5.52	4.69	6.39	
Minimum delay:	0		0		0	0	0	0	0	0	0	0	0	0	
Maximum delay:	20		45		25	45	20	60	30	60	120	60	120	60	
Delay <= 30	103		96		103	96	107	105	107	105	96	96	95	96	
Delay 31-60	0		7		0	7	0	2	0	2	0	1	1	1	
Delay 61-90	0		0		0	0	0	0	0	0	0	0	0	0	
Delay 91-120	0		0		0	0	0	0	0	1	0	1	0		
Delay >120	0		0		0	0	0	0	0	0	0	0	0		
			Totals (all times)												
Total delays mins:	1125		3480		1480	3960									
Avg. delay mins:	1.84		5.67		2.43	6.45									
Minimum delay:	0		0		0	0									
Maximum delay:	120		75		120	75									
Delay <= 30	611		594		610	594									
Delay 31-60	0		17		1	17									
Delay 61-90	0		1		0	1									
Delay 91-120	1		0		1	0									
Delay >120	0		0		0	0									

Canada Customs Primary Delay Data

Grand Total of all Crossings

May 1- August 31, 2002

	Commercial Flow		Travelers Flow	
	Canada	U.S	Canada	U.S.
Total delays mins:	22065	59290	29750	55445
Avg. delay mins:	4.01	10.73	4.85	9.03
Minimum delay:	0	0	0	0
Maximum delay:	120	240	120	180
Delay <= 30	5410	4973	5968	5652
Delay 31-60	82	304	121	300
Delay 61-90	11	137	22	128
Delay 91-120	4	56	9	28
Delay >120	0	37	0	12

Source: Canada Customs Border Delay Archive Database, September 15,2002

Note: These are for just the 6 hourly recordings per day.

Appendix VIII

Detailed Cost Estimates

Detailed Cost Estimates Summary

- The following sections provide detailed estimates on specific categories of border related cost impacts.
- The first section summarizes each of the specific categories of cost impact that were identified during interviews.
- The second section includes the actual cost calculations for each category, along with a lead-in slide explaining the category of costs, anecdotal information about the costs, and the calculation summary. Costs are grouped into two major categories as follows, and within these categories by the type of entity that is impacted as follows:
 - Transit Time/Uncertainty Related Costs
 - Carrier
 - Manufacturer
 - Personal Traveler
 - Societal Costs
 - General Border Management Related Costs
 - Carrier
 - Manufacturer
 - Federal Inspection Services (FIS)
 - This second section also includes a slide summarizing hourly cost assumptions used in the study

Cost Impact Categories

Summary of Cost Impact Categories

- Transit Time/Uncertainty Related Border Costs
 - Carrier Related
 - Primary transit time costs
 - Secondary yard processing time costs
 - Extra time built into routes that proves to be unnecessary
 - Reduced cycles, shorter routes, more equipment and other related costs
 - Time in preparing documentation and faxing
 - Manufacturer Related
 - Higher inventory and related costs
 - Lost productivity due to resourcing to domestic sources
 - Personal Traveler Related
 - Primary transit time costs for personal travelers
 - Extra time built in for business travelers to meet appointments
 - Passenger rail transit time costs
 - General Societal Related
 - Congestion on city streets
 - Pollution from idling trucks
 - Truck hours of service
 - Public infrastructure investment
 - Political impacts

Summary of Cost Impact Categories

- General Border Management Related Costs
 - Carrier Related Costs
 - Carrier general border administration costs
 - Carrier cabotage costs
 - Manufacturer Related Costs
 - Brokerage costs
 - Border related duties, fines and fees
 - Customs administration costs
 - Government costs for Federal Inspection Service (FIS) staff costs

Transit Time/Uncertainty Related Costs

Carrier and Individual Costs/Hour

- For trucking, an average US\$ cost of \$150 per hour was assumed. This cost is based on:
 - Federal Highway Administration Office of Freight Management's report on the Freight Analysis Framework, by Maring and Lambert, which estimates planned delay time costs at US\$144-192 per hour.
 - ICF Consulting's 2002 report titled The Economic Effects of Transportation: The Freight Story, which is the basis for the US\$144-192 estimate for scheduled delay time. They go on to suggest that unscheduled delay time has a cost of US\$371 per hour on average, or about double the planned delay time.
- For personal travelers a cost of US\$10 per hour was assumed based on values used in a Maine Department of Transportation report.

Transit Time/Uncertainty
Related Costs:
Carrier Related Costs

Primary Inspection Transit Time (Backup) and Secondary Yard Processing Time Impact Costs

Primary Transit Time and Secondary Yard Processing Time Impact Costs

- Carriers encounter two types of specific transit time related costs when crossing the border. These costs relate to:
 - Primary Inspection Transit Time (Backup Time) – The time it takes to move from the point where a backup begins until the truck clears the primary inspection booths on the other side of the border.
 - Secondary Yard Processing Time – The time required, for those trucks that are required to enter secondary, to complete all processing and exit the secondary yard.
- The cost estimates for these two types of costs are summarized in the following table.
- For the primary inspection transit time cost calculations the following points should be noted:
 - Average transit times are based on the transit time estimates in the previous section for each key crossing and for an “all other” category.
 - These transit time averages are multiplied by the annualized post 9/11 traffic volumes for the crossing to obtain an estimate of total transit time hours.
 - The total transit time hours are multiplied by the average hourly cost of \$150 to obtain a total minimum annual cost for each crossing.

Primary Transit Time and Secondary Yard Processing Time Impact Costs

- Midrange and maximum estimates are obtained by multiplying the minimum estimate by a factor of 1.20 and 1.30 respectively. These factors are subjective but based on the belief that the Canadian Customs transit time data somewhat understates the extent of backups, that the methodology used here does not fully take into account the high truck volumes at points of extensive delays, and the fact that long backups that extend for several hours are only recorded once every three hours.
- These calculations are summarized in two labeled tables which follow – one for entry to the U.S. and one for entry to Canada.
- For the secondary yard processing time cost calculations the following points should be noted:
 - The calculations begin with the annualized post 9/11 truck volumes for each crossing and “all others.”
 - This volume is multiplied by an estimate of the percent of trucks that enter secondary annually. The percentage entering secondary is based on data from FIS for some crossings, but is primarily based on sample observations made at the key crossings, and on interviews of truck drivers and brokers. These percentages range from 10-40%.

Primary Transit Time and Secondary Yard Processing Time Impact Costs

- Following are some key points about the secondary process:
 - o All trucks not on some form of “line clearance” program such as “Brass,” “PAPS,” or “PARS” must enter secondary in order to complete customs paperwork processing. This may involve checking in with Customs, and a need to visit the broker for each consignment on the truck that needs additional customs documentation processing by the broker. If there are 10 separate consignments on the truck there may be a need for the driver to visit as many as 10 brokers.
 - o Brokers at some crossings are as much as 500 yards away from truck parking areas. There often are lines at broker offices and drivers may wait several minutes in line before even being seen by the broker.
 - o Trucks and/or shipper/consignees that are registered for one of the programs that allow for release at primary are still required to enter secondary when they have more than from 3-5 separate consignments, a situation known as a “trap load.” In these situations the driver does not need to visit brokers, but must wait in line for Customs to process the loads and clear the driver to proceed.

Primary Transit Time and Secondary Yard Processing Time Impact Costs

- Trucks that would normally clear at the primary inspection booth also may be sent to secondary based on a referral by the FIS's automated system, or because an inspector at primary wants the truck inspected. Trucks forwarded to secondary for these reasons most often simply visit an FIS inspector, but in a small percentage of cases (1-3%), the truck may actually be opened and inspected.
- Trucks that are not on a primary release system often spend more time in secondary than might be necessary because drivers do not have proper documentation, do not speak English well enough to understand documentation requirements, or because the shipper and/or consignee have incorrect paperwork. Drivers may also spend longer than should be needed because brokers are not open, or are staffed after hours with insufficiently trained employees.
- It is important to also note that the flow/procedure used for trucks that must enter secondary to visit brokers in the East by both U.S. and Canadian Customs, and by Canadian Customs in the West, is not used at western land crossings for trucks entering the U.S. The typical process is for trucks to approach primary inspection in the other country, and then proceed to secondary. However, in the

Primary Transit Time and Secondary Yard Processing Time Impact Costs

West for entry to the U.S., trucks knowing they need to visit brokers first park in Canada near the border, and then walk unescorted across the border into the U.S. where they visit broker offices. They then return to Canada and proceed to primary, where they clear at primary, or may still be referred to secondary.

- Estimates of the time truckers spend in secondary varies by crossing and direction of travel and ranges from 45 minutes to 105 minutes depending on the scenario and crossing. Estimates on secondary time were based on interviews with brokers, FIS personnel, and drivers.
 - While averages of around 60-75 minutes were most typical for the midrange estimate, it should be understood that many trucks spend less time in secondary.
 - At the same time, it is not uncommon, especially for LTL trucks, to spend far longer in secondary. During on-site visits several drivers were interviewed that had spent up to 10 hours waiting in secondary. Based on these observations it is believed that up to 10—15% of trucks spend far longer than the average time in secondary and many LTL carriers, while a small percentage of all trucks at crossings, assume 2 hours for secondary.

Primary Transit Time and Secondary Yard Processing Time Impact Costs

- Examples of interview findings on the need to enter secondary, and the length of time spent in secondary follow:
 - One major LTL carrier estimates 25% of trucks take 1 hour, 65% take 1.5 hours, and 10% 3-6 hours.
 - Another carrier indicates, that even with PAPS or PARS, when there are trap loads, a visit to secondary cans still average 2 hours by the time they actually get in and out back on road.
 - During one visit the research team observed a 1 hour line of 33 drivers for truckers on Canada's PARS system for drivers to simply get to the front of the line inside the Customs building.
 - Another major LTL carrier estimated 65% of the time it takes 2.5 hours, 20% 3 hours, and 10% 4 hours.
 - Another carrier indicated that at Port Huron once you go to U.S. secondary it is 3 hours, not the 2-3 hours more typical of the Ambassador Bridge. This carrier also observed that Port Huron U.S. brokers, in general, do not process PAPS paperwork that is faxed ahead in a timely way, often resulting in the truck not being able to clear at primary like should be the case.
 - Another major TL carrier indicates 30% of PAPS entries at the Ambassador Bridge fail, requiring them to enter secondary, and that an average stay is 1.5 hours.

Primary Transit Time and Secondary Yard Processing Time Impact Costs

- Another driver indicated that while the average time was 1.5 hours, he had been waiting 10 hours when I talked to him, due to problems with paperwork that the broker had not yet corrected.
 - One FIS management person indicated the secondary rate is about 30%, and that about 25% of all trucks in secondary are LTL, and that LTL's could average 2-4 hours in secondary.
 - Another major LTL feels 2 hours is the norm in secondary, but that 25% of trucks take 2.5 hours.
 - Another major LTL carrier estimated that into the U.S. at Pacific Highway, secondary times are 75% 2 hours and 25% for 4 hours.
 - One of the largest LTL's in the U.S. estimated secondary time entering the U.S. at the Ambassador Bridge to average 2.5 hours.
 - Generally, carriers estimated there was a longer average time in secondary when entering the U.S., and that it was somewhat shorter entering Canada.
- Based on the above kinds of information, only a small portion of which is shown above, estimates of secondary times were generated for each crossing for each direction for each of the three scenarios. These estimates were then multiplied times the assumed number of trucks entering secondary per year to arrive at total annual hours of processing time.

Primary Transit Time and Secondary Yard Processing Time Impact Costs

- The total hours of delay for each crossing for each scenario were then multiplied by the US\$150 per hour truck cost to arrive at total secondary yard processing time costs.
- These calculations are summarized in the tables which follow.

Primary Transit Time and Secondary Processing Costs (Millions of U.S. \$'s)

Category/Assumption	Minimum	Midrange	Maximum
Entering USA			
Primary	\$213.4	\$256.1	\$277.5
Secondary	<u>392.5</u>	<u>483.4</u>	<u>574.4</u>
Total	605.9	739.5	851.9
Entering Canada			
Primary	61.9	68.1	74.3
Secondary	<u>210.0</u>	<u>272.0</u>	<u>333.9</u>
Total	271.9	340.1	408.2
Total U.S.-Canada			
Primary	275.3	324.2	351.8
Secondary	<u>602.5</u>	<u>755.4</u>	<u>908.3</u>
Total	877.8	1079.6	1260.1

PRIMARY TRANSIT TIME IMPACTS

ENTERING USA

COMMERCIAL TRUCKS

	Annualized Post 9/11 Traffic (000'S)	Average Delay Min	Transit Hours (000'S)	\$ Cost/Hr	Minimum Cost (Millions US\$)	Middle Impact (Millions US\$)	Maximum Impact (Millions US\$)
Calais	127	14.04	30	150	4.5	5.3	5.8
Champlain	362	14.2	86	150	12.9	15.4	16.7
Lewiston	527	1.21	11	150	1.6	1.9	2.1
Peace Bridge	678	4.33	49	150	7.3	8.8	9.5
Ambassador Bridge	1678	28.82	806	150	120.9	145.1	157.2
Detroit Tunnel	76	5.67	7	150	1.1	1.3	1.4
Sarnia	845	11.69	165	150	24.7	29.6	32.1
Pembina	214	1.53	5	150	0.8	1.0	1.1
Pac Highway	487	15.09	122	150	18.4	22.0	23.9
Peace Arch	0	0	0	150	0.0	0.0	0.0
All Other Locations	1930	4.42	142	150	21.3	25.6	27.7
Total U.S. - Canada	6924		1423		213.4	256.1	277.5

1 Annualized traffic based on U.S. Customs 2002 May YTD monthly data for totals and non bridges.

For bridges annualized traffic based on BTOA Sept YTD monthly 2002 data.

2 Average TRANSIT based on Canada Customs delay data for entry to U.S.

3 Costs per hour based on Federal Highway Administration Office of Freight Operations reports.

4 Middle and maximum impacts represent 1.20 and 1.3 times base minimum based on reasons explained in general slide on primary.

PRIMARY TRANSIT TIME IMPACTS

ENTERING CANADA

COMMERCIAL TRUCKS

	Annualized Post	Average	Transit		Minimum Cost	Middle Impact	Maximum Impact
Location/Assumption	9/11 Traffic (000'S)	Delay Min	Hours (000'S)	\$ Cost/Hr	(Millions US\$)	(Millions US\$)	(Millions US\$)
Calais	67	1.65	2	150	0.3	0.3	0.3
Champlain	403	6.2	42	150	6.2	6.9	7.5
Lewiston	527	1.36	12	150	1.8	2.0	2.2
Peace Bridge	678	1.42	16	150	2.4	2.6	2.9
Ambassador Bridge	1678	3.3	92	150	13.8	15.2	16.6
Detroit Tunnel	76	1.84	2	150	0.3	0.4	0.4
Sarnia	845	8.09	114	150	17.1	18.8	20.5
Pembina	206	3.5	12	150	1.8	2.0	2.2
Pac Highway	389	8.69	56	150	8.5	9.3	10.1
Peace Arch	0	0	0	150	0.0	0.0	0.0
All Other Locations	1928	2.01	65	150	9.7	10.7	11.6
Total U.S. - Canada	6797		413		61.9	68.1	74.3

Annualized traffic based on Stats Canada 2002 May YTD monthly data for totals and non bridges

For bridges annualized traffic based on BTOA Sept YTD monthly 2002 data halved to reflect estimated single direction traffic.

2 Average transit based on Canada Customs delay data for entry to Canada.

3 Costs per hour based on Federal Highway Administration Office of Freight Operations reports.

4 Middle and maximum impacts represent 1.10 and 1.2 times base minimum based on reasons explained in general slide on primary.

SECONDARY YARD PROCESSING TIME COST

COMMERCIAL TRUCKS

ENTERING USA

Location/Assumption	Annualized Post 9/11 Traffic (000'S)	Secondary %	Weighted Average Minutes in Secondary			US\$ Cost/Hr	Total Cost in Millions of US\$		
			Minimum	Middle	Maximum		Minimum	Middle	Maximum
Calais	129	40%	60	75	90	150	7.7	9.7	11.6
Champlain	362	40%	60	75	90	150	21.7	27.2	32.6
Lewiston	527	35%	60	75	90	150	27.7	34.6	41.5
Peace Bridge	678	15%	45	60	75	150	11.4	15.3	19.1
Ambassador Bridge	1678	35%	60	75	90	150	88.1	110.1	132.1
Detroit Tunnel	76	10%	75	90	105	150	1.4	1.7	2.0
Sarnia	845	35%	60	75	90	150	44.4	55.5	66.5
Pembina	214	40%	75	90	105	150	16.1	19.3	22.5
Pac Highway	487	40%	60	75	90	150	29.2	36.5	43.8
All Other Locations	1930	40%	75	90	105	150	144.8	173.7	202.7
Total U.S. - Canada	6926						392.5	483.4	574.4

1 Annualized traffic based on post 9/11 U.S. Customs May YTD five month data for non-bridges.

Annualized traffic for bridges based on half of BTOA Sept YTD nine month data.

2 Secondary % is based on observations and interviews and data from operators/FIS in a few cases. Key auto industry crossings tend to have a lower secondary rate.

Peace Bridge and Ambassador Bridge rates are based on operator/FIS data.

3 Average time in secondary is based on observations and interviews and reflects a weighted average estimate for each of the three scenarios (min,middle, max).

The average reflects fact that a % of trucks entering secondary stay 1 hour, another % 2 hours, and a small percent 4-5 hours. Assumes LTL is 30% of total.

4 Hourly costs based on Federal Highway Administration reports.

Route Planned Time in Excess of Actual Primary/Secondary Average Time

- In order to plan routes, and to assure trucks arrive within scheduled delivery windows, carriers must make assumptions about the length of time it will take to cross the border. A few examples of what carriers told us about planning assumptions follow:
 - One Windsor manufacturer that ships to Wal-Mart distribution centers in the U.S. told us they leave 4-5 hours earlier than necessary in order to make sure they arrive on time and are not fined by Wal-Mart.
 - An injection molding firm in London, Ontario leaves 5-6 hours earlier than necessary in order to arrive at Ford plants for scheduled equipment deliveries. If they miss the delivery they may have to wait 12 hours for another window when technicians are available.
 - In the auto industry, third parties routinely assume 2 hours for border crossing time according to several third parties that were interviewed.
- When the border crossing time does not take the required time, the excess planned time is in effect lost time to the carrier and in many cases cannot be recouped.

Route Planned Time in Excess of Actual Primary/Secondary Average Time

- For purposes of estimating this total cost, an assumed amount of total planned time is calculated, and the actual border crossing time identified in the previous section for both primary and secondary is subtracted, resulting in a net excess plan time cost that avoids any double counting.
- The actual calculation approach was as follows:
 - The total number of trucks crossing the border per year was the starting point.
 - Depending on the scenario, it was assumed that between 40-60% of trucks are engaged in route planning that exceeds the actual time.
 - An assumed route planning time for the border was then estimated, ranging from 1.5 to 2.0 hours depending on the scenario, and multiplied times the number of trucks subject to this calculation, resulting in total planned route hours for the year.
 - The total plan hours was then multiplied by the hourly truck cost.
 - Finally, depending on the scenario, it was assumed that 35-45% of this excess plan time was actually non-recouperable and resulted in a border related cost in excess of the actual transit time calculated previously.
- These calculations are summarized in the following table:

**Route Planned Time in Excess of Actual
Primary/Secondary Average Time
(Millions of U.S. \$'s)**

Assumption/Scenario	Minimum	Midrange	Maximum
Total Planned Hours	8019	13366	16040
Actual Primary/ Secondary Hours	5853	7197	8401
Unnecessary Plan Hours	2166	6169	7639
US\$ Cost/Hour	150	150	150
Unnecessary Plan Hours Cost	324.9M	925.4M	1146.0M
% Non - Recoupable	35%	45%	45%
Non-Recoupable Cost	US\$113.7M	US\$416.4M	US\$515.7M

Reduced Cycles and Other Related Costs From Uncertainty

- Because of uncertainty in crossing times, carriers incur a variety of potential additional costs to their operations.
- These costs include:
 - A reduction in the number of cycles possible per day with a given piece of equipment and driver.
 - Reduced route distances from the border.
 - Less consignments per truck in order to avoid secondary.
 - Excessive wait times because of missed delivery windows.
 - Missed exchanges at terminals or cross-dock points.
 - The need to warehouse goods because businesses have closed when they arrive behind schedule.
- Numerous interviewees told us of situations where they previously got 3-4 crossing cycles per day but now get just 2. Examples include:
 - A major package express carrier that now gets 2 cycles instead of 3 on LTL loads.
 - A major automotive manufacturer whose private fleet used to get 3 cycles on some routes but now gets no more than 2.

Reduced Cycles and Other Related Costs From Uncertainty

- Testimony at Windsor City Council indicating auto haulers, on certain runs are now getting 2 cycles instead of 3.
- Champlain part time drivers that used to do 2 round trips to Montreal that now can do just 1.
- A major U.S. LTL that indicates that on their terminal to terminal cross-border moves they are down from 3 to 2 cycles.
- Information from a major Canadian freight carriers association indicating that many carriers have gone from 3 to 2 cycles.
- Several carriers told us of the need to now limit the total distance on routes because of uncertainty at the border. This also affects the distances at which same day delivery can be promised. For instance, Toronto to Detroit area runs are difficult now given 10 hour “hours of operation” rules. Also, a run that previously would have allowed a drop-off and time for a pickup for the return leg may now have to return empty because it is too late in the afternoon to do the pickup.
- Another cost relates to efforts to avoid secondary with “trap loads.” Several carriers and shippers told us of efforts to reduce the number of consignments on a truck to less than the 5 that automatically results in a referral to secondary at most crossings. While this assures faster and more reliable crossing times, it adds shipping cost.

Reduced Cycles and Other Related Costs From Uncertainty

- Uncertainty can also reek havoc on LTL's terminal operations and result in additional cost as special shuttle or delivery runs are necessary when line-haul freight arrives late due to uncertainty at the border. These costs are often front loaded because carriers build in additional line-haul time to assure arrival before local delivery runs begin, but can result in delivery runs beginning too late for completion. If this is not done, however, and trucks arrive late, special delivery runs must be added to meet delivery guarantees or freight is delivered a day late. This uncertainty can also affect TL operations.
 - It is not uncommon for a truckload carrier to take 2-3 consignments to exchange points in a distant city where freight is offloaded to a waiting truck in a given exchange point city. This is especially common for goods moving into sparsely populated areas of Canada. When the originating truck is late due to border delays, the receiving truck may have to wait inordinate amounts of time, and may end up with insufficient time to reach destinations and make delivery.
 - Several drivers told us of exchange problems. One example was relayed by a driver who described a situation where he was to make a cross-dock drop to a waiting truck in Toronto but because he had been at secondary for 4 hours, the receiving truck had to leave. Because it was a holiday weekend Friday this was going to lead to major problems.

Reduced Cycles and Other Related Costs From Uncertainty

- One final impact category relates to warehouse and handling costs resulting from border uncertainty. These costs can be incurred due to unexpected inspections at the border which result in unloading and loading labor costs, and sometimes warehouse costs when goods are left behind at Customs so that the driver and equipment are not tied up. Or the costs may be incurred at cross-dock exchange point cities or in the destination city when exchanges are missed and/or when trucks arrive too late to make scheduled deliveries that day. The result is often a need to warehouse the goods – especially on Friday incidents before the weekend.
- Given these kinds of costs, an estimate of the total cost for this overall category has been calculated. The calculation assumes, however, that these costs are only incurred by a small percentage of all trucks crossing the border. The calculation approach was as follows:
 - Total cross-border freight cost was calculated starting with total truck borne trade of US\$235 billion, and depending on the scenario, assuming a freight cost of 4-5% of the value of the goods.

Reduced Cycles and Other Related Costs From Uncertainty

- Depending on the scenario, it was assumed that between 7-12% of total freight was subject to the kinds of costs described above. These percentage estimates are based on information gathered throughout the study and reflect our best judgment on the likely cost range.
- It was then further assumed that, depending on the scenario, additional costs of 10-14% would be incurred because of these special costs. These percentages are also based on our best judgment.
- The results of these calculations are shown in the following table:

Reduced Cycles and Other Related Costs From Uncertainty (Millions of U.S. \$'s)

Assumption/Scenario	Minimum	Midrange	Maximum
Total Cross-Border Freight Cost at Domestic Like Rates	9400.0	10583.0	11750.0
% Subject to Excess Costs	7%	10%	12%
Total Freight Subject to Special Costs	658.0	1006.0	1410.0
% Increase For These Costs	10%	12%	14%
Total Special Costs	65.8	120.7	197.4

Driver Documentation/Fax Time

- Drivers can spend a considerable amount of time preparing necessary documentation for clearing Customs. This time has been increased with the advent of carrier specific primary lane clearance programs like PAPS into the U.S., and PARS into Canada.
- Based on interviews it is common for drivers to spend significant amounts of time away from the border completing this paperwork. This is often done at truck-stops. However, not all drivers must perform this work, and in many cases, it is done at the carrier office.
- In many ways, pre-arrival facilities such as those at the Peace Bridge for entry to the U.S., are related to documentation preparation.
- Based on many interviews with drivers and carrier management, it is estimated that this time can range from 20-40 minutes per crossing, and times in this range have been used for each of the respective minimum, midrange and maximum scenarios that are used for each cost category.

Driver Documentation/Fax Time

- The approach to calculating these costs was as follows:
 - Total truck traffic was multiplied by a percentage reflecting the number of trucks that are subject to these kinds of costs. The percentage, depending on the scenario ranged from 20-30% and reflected the research team's best judgment given a variety of interviews addressing the topic.
 - The number of trucks affected were then multiplied by an estimate of the total minutes involved per truck to arrive at total truck hours on this task. The time ranged from 20-40 minutes depending on the scenario and was estimated based on a number of interviews with drivers.
 - The total hours were then multiplied by the hourly truck cost to obtain total cost estimates by scenario.
- The results of these calculations are reflected in the following table:

Driver Documentation/Fax Time (Millions of U.S. \$)

Assumptions/Scenario	Minimum	Midrange	Maximum
Total Truck Traffic	13366	13366	13366
% With Driver Time On Documentation/Fax	20%	25%	30%
Total Trucks Affected	2673	3342	4010
Minutes on Task	20	30	40
Total Hours on Task	.890M	1.671M	2.673M
US\$ Cost/Hour	150	150	150
Total Cost	US\$133.5	US\$250.7M	US\$400.9M

Transit Time/Uncertainty
Related Costs:
Manufacturer Related Costs

Manufacturer Inventory Carrying Costs

- Uncertainty in transit times can lead manufacturers to increase inventory levels to assure that goods are available at the destination when needed. This is true whether the destination is a customer or an internal facility.
- During the study evidence of increased inventory levels was developed.
- The research team felt there was sufficient indication of a border effect on inventory to warrant some estimates of these costs.
- The calculation of this effect assumed the following:
 - The U.S.-Canada truck borne trade of US\$235 billion was divided by the number of business days in the year to obtain the value for 1 day of supply or US\$.064 billion.
 - Based on interviews and overall project research, for each scenario an additional 2, 4 or 6 days of supply was assumed to be necessary due to border effects.
 - For instance, for the midrange estimate, if 10 turns are assumed pre-effect, inventory would equal US\$23.5 billion, and a decrease in turns to 9 would raise inventory by US\$2.54 billion, to a total of US\$26.04 billion. Turns for the minimum and maximum scenarios respectively change to 9.4 and 8.6 respectively.
 - The extra inventory was assumed to have an inventory carrying cost of 18%.
- The results of these calculations are shown in the next table:

Manufacturer Inventory Carrying Costs (Millions of US\$)

Assumptions/Scenario	Minimum	Midrange	Maximum
Total Truck Trade	US\$235.0B	US\$235.0B	US\$235.0B
1 Day Supply of Trade	.064B	.064B	.064B
Extra Days Supply Due to Border	2	4	6
Total Extra Inventory	1.28B	2.56B	3.84B
Assumed ICC%	18%	18%	18%
Extra ICC Due to Border	US\$229.0M	US\$458.0M	US\$686.0M

Reduced Canadian Sourcing Lost Productivity Benefits

- This section estimates the lost productivity benefits to the U.S. economy that have resulted from reducing imports from Canada by more than what would be expected from a simple reduction in economic activity.
- U.S. companies sourced US\$215.6B in goods and services from Canada at an annualized 9 month YTD pre 9/11 rate.
- This sourcing from Canada occurred because U.S. companies expected to receive some benefit – likely related to lower costs, better quality, and/or a better spec. These individual benefits translated into increased productivity and global competitiveness for the U.S. economy as a whole.
- However post 9/11 for the same 9 month annualized period, these imports from Canada dropped 10.83% compared to the same pre-9/11 period.
- This drop-off might be explained by reduced economic activity in the U.S. following 9/11. However, U.S. industrial production post 9/11 dropped just 3.66% over the 9 months. At the same time, U.S. auto production, which accounts for a good deal of Canadian imports, actually increased 4.5%.

Reduced Canadian Sourcing

Lost Productivity Benefits

- After backing out the decrease in Canadian imports that one would expect from reduced economic activity using the drop in industrial production, imports still dropped by an unexplained US\$15.33B. During this time period the value of the Canadian dollar, one possible other explanation for the drop-off, held relatively stable, thereby eliminating it as a cause for the most part.
- We believe that a likely significant factor in the drop is that U.S. buyers had conscious and subconscious concerns about sourcing from Canada given actual and perceived problems with current and/or future border crossing reliability.
- As shown in the following table, the resulting U.S. economic impact of this reduced sourcing from Canada, assuming foregone productivity benefit scenarios of 7, 10 or 13%, ranges from US\$1.07B to US\$2.00B, with a midrange estimate of US\$1.53B.
- Of course the other impact is in Canada where there are reductions in land exports to the U.S. of US\$23.20B at a pre to post nine month annualized rate.
- This fall-off in exports to the U.S. would seem to substantiate concerns about this possibility that have been expressed by a number of Canadian manufacturing and trade associations.
- The results of the calculations described above are shown in the next table:

Reduced Canadian Sourcing Lost Productivity Benefits

(Billions of US\$'s)

Assumptions/Scenario	Minimum	Midrange	Maximum
Canadian Land Exports Down Annualized 10.83%	US\$23.20	US\$23.20	US\$23.20
Expected Drop Due To Industrial Production Decline of 3.66%	7.87	7.87	7.87
Net Reduction in Land Imports Due to Non- Economic Reasons	15.33	15.33	15.33
Assumed Productivity Benefit From Canadian Imports	7%	10%	13%
Reduced Canadian Sourcing Impact	US\$1.07	US\$1.53	US\$2.00

Transit Time/Uncertainty
Related Costs:
Personal Traveler Related Costs

Personal Vehicles

Primary Inspection Transit Time Costs

- This section estimates the costs for personal travelers from primary inspection transit time, or the time it takes to move from the point where a backup begins until the auto clears the primary inspection booths on the other side of the border.
- For the primary inspection transit time cost calculations the following points should be noted:
 - Average transit times are based on the transit time estimates summarized in Appendix VII.
 - These transit time averages are multiplied by the annualized post 9/11 traffic volumes for the crossing to obtain an estimate of total transit time hours.
 - The total transit time hours are multiplied by the average hourly cost of \$10 to obtain a total cost for each crossing.
 - The total cost figure is adjusted by a factor to arrive at the minimum, midrange and maximum cost estimates. These factors are subjective but based on the belief that the Canadian Customs transit time data somewhat understates the extent of backups, and that the methodology used here does not fully take into account the high volumes at points of extensive backups.
 - These calculations are summarized in one table which follows, with additional detail in the following two tables for each direction of travel.

Personal Vehicles

Primary Inspection Transit Time Costs (Millions of US\$)

Category/Assumption	Minimum	Midrange	Maximum
Entering USA	\$30.9	\$37.1	\$40.1
Entering Canada	15.8	18.9	20.5
Total U.S.-Canada	46.7	56.0	60.6

PRIMARY TRANSIT TIME IMPACTS

ENTERING USA

PERSONAL VEHICLES

	Annualized Post	Average	Total Transit		Minimum Cost	Middle Impact	Maximum Impact
Location/Assumption	9/11 Traffic (000'S)	Transit Min	Hours (000'S)	\$ Cost/Hr	(Millions US\$)	(Millions US\$)	(Millions US\$)
Calais	801	14.05	188	10	1.9	2.3	2.4
Champlain	754	7.39	93	10	0.9	1.1	1.2
Lewiston	1743	1.6	46	10	0.5	0.6	0.6
Peace Bridge	3482	4.86	282	10	2.8	3.4	3.7
Ambassador Bridge	3587	10.83	647	10	6.5	7.8	8.4
Detroit Tunnel	3367	6.45	362	10	3.6	4.3	4.7
Sarnia	2001	4.15	138	10	1.4	1.7	1.8
Pembina	173	1.78	5	10	0.1	0.1	0.1
Pac High./Peace Arch	2299	20.3	778	10	7.8	9.3	10.1
All Other Locations	10720	3.07	549	10	5.5	6.6	7.1
Total U.S. - Canada	28927		3088		30.9	37.1	40.1

1 Annualized data based on U.S. Customs 2002 May YTD monthly data for totals and non bridges.

For bridges annualized data based on BTOA Sept YTD monthly 2002 data.

2 Average transit based on Canada Customs delay data for entry to U.S.

3 Costs per hour based on Federal Highway Administration guidelines.

4 Middle and maximum impacts represent 1.20 and 1.3 times base minimum based on reasons explained in general slide on primary.

5 Note Pac Highway and Peace Arch traffic data is not reported separately by U.S. Customs and no BTOA data available so combined.

Transit time is an estimated weighted average time combining data for Peace and Pac Hwy with Peace weighted more heavily. 137

PRIMARY TRANSIT TIME IMPACTS

ENTERING CANADA

PERSONAL VEHICLES

	Annualized Post	Average	Total Transit		Minimum Cost	Middle Impact	Maximum Impact	
Location/Assumption	9/11 Traffic (000'S)	Transit Min	Hours (000'S)	\$ Cost/Hr	(Millions US\$)	(Millions US\$)	(Millions US\$)	
Calais	948	1.66	26	10	0.3	0.3	0	
Champlain	900	7.77	117	10	1.2	1.4	1.5	
Lewiston	1743	2.25	65	10	0.7	0.8	0.8	
Peace Bridge	3482	2.33	135	10	1.4	1.6	1.8	
Ambassador Bridge	3587	2.26	135	10	1.4	1.6	1.8	
Detroit Tunnel	3367	2.43	136	10	1.4	1.6	1.8	
Sarnia	2001	7.77	259	10	2.6	3.1	3.4	
Pembina	163	6.51	18	10	0.2	0.2	0.2	
Pac Highway	991	5.11	84	10	0.8	1.0	1.1	
Peace Arch	1159	10.39	201	10	2.0	2.4	2.6	
All Other Locations	10245	2.34	400	10	4.0	4.8	5.2	
Total U.S. - Canada	28586		1576		15.8	18.9	20.5	

1 Annualized traffic based on U.S. Customs 2002 May YTD monthly data for totals and non bridges.

For bridges annualized traffic based on BTOA Sept YTD monthly 2002 data.

2 Average transit based on Canada Customs data for entry to Canada

3 Costs per hour based on Federal Highway Administration guidelines.

4 Middle and maximum impacts represent 1.10 and 1.2 times base minimum based on reasons explained in general slide on primary.

Business Traveler Planned Time in Excess of Actual Primary Transit Time

- This section calculates the costs incurred by business travelers who must leave early for cross-border appointments because of uncertainty over border crossing times
- The calculation approach is as follows:
 - The number of business travelers per year was calculated based on 2nd qtr Statistics Canada traveler data and their data on the % of travelers that are business related.
 - Based on interviews with various organizations and border crossing commuters an estimate of the percent that leave early was developed, ranging from 40-55% depending on the scenario.
 - Next estimates were made of the 1/10ths of an hour of cushion that business travelers allow themselves to leave early, with the time ranging from .5 to .7 of an hour depending on the scenario.
 - Next, the total hours of cushion time were multiplied by an average cost per hour of business traveler time value of \$100 to arrive at the total cost of this cushion time.
 - Finally, the cost of actual primary inspection transit time cost for business travelers was subtracted to avoid any double counting.
- The results of these calculations are shown in the next table.

Business Traveler Planned Time in Excess of Actual Primary Transit Time (Millions Of Units)

Assumptions/Scenario	Minimum	Midrange	Maximum
Number of Travelers/Year Based on 2 nd Qtr Data	62.1	62.1	62.1
% Work Related	8.5%	8.5%	8.5%
Number of Business Travelers*	5.30	5.30	5.30
% Who Leave Early	40%	50%	55%
Number Leaving Early	2.12	2.65	2.92
Hours Leave Early By	.5	.6	.7
Total Leaving Early Hours	106.0	159.0	205.0
Cost/Hour for Business	US\$100	US\$100	US\$100
Total Cost of Leaving Early	106.0	159.0	205.0
Less Business Primary Costs Already Counted	56.0	56.0	56.0
Net Cost of Leaving Early	US\$50.0M	US\$103.0M	US\$149.0M

*Based on Stats Canada Traveler Data

Transit Time/Uncertainty
Related Costs:
Societal Related Costs

Societal Related Costs

- Increased transit times, and uncertainty over the length of transit times, along with congestion at border crossings, creates a number of externalities that are manifested as various societal costs. While it was not possible to quantify these costs, anecdotal material on each is summarized here.
- The first category of societal cost relates to congestion around border crossings. During site visits, and in the review of newspaper articles, extensive information on the levels of congestion and associated costs were developed. While perhaps most severe in Calais-St. Stephen, Windsor and Niagara, Ontario, and to a more limited degree at the Peace Arch crossing at Blaine-Douglas, and at Port Huron-Sarnia, the potential for border related congestion exists at all crossings.
 - Congestion around the approaches to crossings is most severe when the approaches are on city streets, as is the case in Windsor, Niagara and St. Stephens. Congestion not only affects border crossers, but also local street traffic.

Societal Related Costs

- The most severe truck related congestion is at Windsor where trucks back up Huron-Church Road, a major north-south route in Windsor which provides the only access to the 401 X-Way to Toronto, as they await entry to the Ambassador Bridge plaza.
 - Backups have become far more severe since 9/11 when processing times increased and backups became much longer, and the bridge management began holding trucks at the base of the bridge instead of letting them idle on the bridge.
 - During the summer of 2002 it was common for trucks to back up 2-3 miles along Huron-Church, with intersections occasionally being blocked, and access to street-side businesses made quite difficult for local residents using Huron-Church. In order to address this problem the city management mandated that all trucks stay in the center lane of the approach to the bridge so as to allow business access from the outside lane. However this policy has also had the effect of doubling the length of lineups on Huron-Church since trucks are now restricted to one lane.
 - While the problem should have been somewhat alleviated by U.S. Customs opening 3 additional truck inspection booths, thereby increasing capacity by 50% to 9 booths, an inability to staff all the booths all the time, and perhaps increased processing times, has resulted in continuing problems through the Fall.

Societal Related Costs

- In an effort to bypass the queues, many intercity trucks have gone around the backups by using major 2 lane side streets to “cut the queue,” thereby causing backups of trucks of as long as 10 blocks. Most of these streets are truck routes which also allow major local businesses such as the auto companies access to the bridge. These backups make it impossible at times for residents to use their streets, block access to area K-12 schools, and make access to the University of Windsor difficult at times.
 - These backups on Huron Church and side streets have raised a great deal of citizen concern, with almost daily articles in the Windsor Star newspaper, and daily letters to the editor from citizens.
- Another set of Windsor backups occurs at the mouth of the Detroit – Windsor auto tunnel at the intersection of Wyandotte and Goyeau streets. Again, because authorities do not want cars to back up in the tunnel, cars are held at the mouth until most cars have cleared Customs on the other side. Because of this policy, and longer processing times, a great deal of congestion is created at this major city intersection. The result is that it is very hard to access the tunnel at peak times, and local traffic must deal with a great deal of congestion and time delay.
 - In both the case of Huron Church Road and Wyandotte/Goyeau Windsor police have had to expend thousands of hours of effort. During the summer of 2002 it was not at all uncommon to see 3-5 officers controlling traffic throughout the heart of the day.

Societal Related Costs

- Similar problems exist in downtown Niagara Falls, Ontario, in St. Stephens, and at Blaine, Washington, although in the later case access roads are not as congested. While the tunnel entrance is in downtown Detroit, backups are not nearly as common. And while the access to the Ambassador Bridge on the U.S. side is on I75/I96, and backups into Canada are less common, backups that do occur often cause a lineup of trucks on the X-way trying to exit to the bridge. And in downtown Niagara Falls and St. Stephens auto traffic, and truck traffic as well in the case of St. Stephens, can cause very severe congestion very quickly as there really are no stacking areas that don't affect local traffic.
- All of this congestion can lead to some major air and noise pollution issues. In Windsor, where the cancer rate is alleged to be the highest in Canada already, there is a great deal of concern about air pollution from idling trucks. On Windsor side streets that trucks use to cut into the foot of the bridge, idling truck's smokestacks are sometimes less than 20 feet from residential windows. Truck pollution is also a serious problem in downtown St. Stephens-Calais.

Societal Related Costs

- Another major problem relates to longer transit times and uncertainty over transit times, and the impact that this has on driver hours of service.
 - Drivers that are caught in long backups often go over their hours of service limits according to many drivers that were interviewed. This may result for instance in drivers counting broker time at secondary as sleep time.
 - In addition, trucking companies may continue to try to complete round trip moves in one day that were possible before 9/11, such as Toronto – Detroit, however, this trip is often not feasible post 9/11.
 - Larger LTL carriers indicated they periodically have to relieve drivers at the border to avoid violations, adding significant cost to their operations. Also because LTL's typically do not have "sleepers" this may mean hotel costs.
 - Also, congestion and paperwork requirements at the border, and poor work conditions at the border, helps contribute to a very high turnover in cross-border drivers, resulting in many new drivers that do not understand documentation requirements and that are potentially not as experienced and safe.
 - The desire of many smaller trucking companies to avoid the border also may lead to reduced competition for cross-border freight rates and higher costs than would otherwise be the case. In fact several LTL's that purchase their cross-border line-haul service told us they had a hard time finding such operators, and had to pay a premium to attract them.

Societal Related Costs

- Also, when hours of service limits are reached because of unplanned border time, goods may need to be left at the border, or taken to a terminal for overnight storage, resulting in late deliveries to customers
- Longer processing times since 9/11, along with frequent spikes in those times for security reasons, has also led to a need for additional crossing roadbed and inspection capacity that may not have been necessary for some time absent the heightened security. Adding this capacity is often very costly due to the geography of the border (rivers requiring major bridges or tunnels at many eastern crossings), and difficult given a lack of space and major facilities that are adjacent to the crossings. Examples of some of the potential border crossing costs include:
 - C\$300 million being planned for Windsor access roads, if a way can be found to add capacity, given citizen opposition.
 - An additional C\$450 million of federal money, over and above C\$150 million of federal money in the Windsor project, for other border crossing enhancements around Canada.
 - US\$600 million in expenditures being planned by the State of Michigan for several crossing gateways, access roads and plazas.
 - C\$75 million being planned for Lacolle-Champlain.

Societal Related Costs

- Problems at border crossings and citizen concern about a variety of related issues has forced the political leadership to spend a great deal of time on these issues, especially in Canada.
 - In Windsor, border issues have been a major factor in recent federal parliamentary elections.
 - They also have forced a heated battle over which of three proposed plans to increase roadbed capacity into and out of border crossings should be adopted and funded. This has forced the Mayor and City Council to take positions against several proposals.
 - The issue over which of three plans to adopt in Windsor has led to several meetings with as many as 800 citizens attending, demonstrating the considerable interest the issue attracts.
 - Perhaps no better phrase summarizes the extreme level of concern in Windsor than this quote from an editorial on the subject in the Windsor Star:
 - “The fix is in to sacrifice South Windsor and the city’s long suffering west end in order to placate Toronto trucking companies and Ontario manufacturers who view this city as merely an annoying impediment. The odds are stacked against Windsor as it begins the biggest fight of its existence. At stake is the health of every resident and the city’s very future. Will it remain a viable community, albeit with serious environmental challenges? Or will it become an 18 wheeler dumping ground?”

Other Border Related Costs

Other Border Related Costs Carrier Related

Carrier Border Administrative Costs

- Carriers incur a great deal of cost related to border administration. These costs relate to headquarters administration for planning and oversight, headquarters staff for information systems support and interaction with FIS systems, headquarters staff for processing customs related paperwork, field staff at border crossings to facilitate crossings, and dispatcher time involved in resolving border related delays and uncertainty. Examples of some of these costs include:
 - Con-Way Transportation costs of US\$15-20 million to implement border security related requirements.
 - Carriers such as Overland and Reimer Express that have agents at the border to assist drivers, with one carrier indicating their border agents alone cost US\$4 million per year.
 - A major U.S. carrier that has a large Canadian border processing center staffed with a number of employees.
 - Another carrier that indicates they have 10 headquarters staff in handling PARS and PAPS processing alone.

Carrier Border Administrative Costs

- Carrier administrative costs are based on estimates developed from secondary sources and interviews, including:
 - Interviews with a number of carrier managements.
 - Interviews with carrier trade associations in Canada and the U.S.
 - Interviews with brokers re carrier costs.
 - Interviews with carrier personnel located at border crossings.
 - Review of trade magazine articles on the subject of carrier border management costs, with an emphasis on costs related to implementing new border security MIS systems and interfaces with FIS and broker computers.
- Following are estimated costs:

Assumption/Scenario	Minimum	Midrange	Maximum
Estimated Costs	US\$100.0	US\$200.0M	US\$250.0M

Carrier Cabotage Costs

- Cabotage restrictions on Canadian carriers operating in the U.S. continue to have a major productivity robbing impact. Specifically, U.S. immigration rules continue to be a problem and have the effect of restricting drop and hook operations, restricting repositioning moves that are not in-line to the border, and have even had the effect of making cross-border intermodal operations more difficult.
- One of Canada's larger LTL's indicated they estimate that if Canadian carriers followed the law to the letter, that it would cost some C\$500 million per year. This estimate forms the upper end of our cabotage cost impact estimates. This carrier mentioned one account where cabotage restrictions were costing them C\$100,000 per year.
- Another carrier reported a typical example in which they take a load from Canada to Denver but cannot get a return load to Canada. While a broker can give him a load in Kansas City he would have to reposition to their empty. As a result he simply returns to Canada empty.

Carrier Cabotage Costs

- On the Canadian side there are various equipment regulations that some feel are designed to have the effect of keeping out U.S. carriers. For instance in British Columbia, a 2” differential in chassis length regulations restricts typical U.S. equipment from being used in B.C.
- A private carrier operation for an injection molding firm provided another example of the impact. Their truck often makes deliveries of equipment to a Ford assembly plant in the U.S. At this plant there is a die of theirs that needs to go to another Ford location that the driver happens to be going to next in order to do a pickup for a return trip to Canada. However the driver cannot take the die from Ford location A to B because of cabotage restrictions. As a result his company must hire a for-hire carrier to make the interplant move.

Carrier Cabotage Costs

o A third example of the impact of cabotage laws can be found in the intermodal rail industry cross-border. Consider a load moving on a Canadian trucking company from Toronto to Lansing. The carrier decides they would like to take advantage of CP Rail's Xpressway service from Toronto to Detroit for the line-haul portion of the move. They then plan on picking up the load in Detroit with their Windsor terminal power and driver and delivering it to Lansing. They and CP consider this to be one overhaul international move. However U.S. Immigration says the pickup in Detroit and delivery to Lansing is a domestic U.S. move reserved for U.S. carriers. In order to address problems of this type CP now drops certain trailers at an additional stop in Windsor before proceeding to Detroit, adding cost and time.

o While it is very difficult to quantify these costs, a conservative estimate puts these costs at the C\$500 million referred to by the Canadian carrier, however we have used this estimate for the upper end. We have reduced this estimate substantially for a midrange and low end figure.

Assumption/Scenario	Minimum	Midrange	Maximum
Cabotage Costs	US\$100.0	US\$150.0	US\$333.3M

Other Border Related Costs Manufacturer Related

Customs Brokerage Costs

U.S.-Canada Transactions

- Customs brokerage costs are a major impact that results from the present border management approach.
- Costs typically relate to fees paid to third party customs brokerage firms on a per entry basis, but also include other fees paid to brokers for more specialized support services.
- Costs also relate to in-house staffs that may be employed by larger firms to process customs paperwork.
- An estimate of total brokerage costs paid by companies in one country for entry to the other was difficult to develop. A number of Canadian and U.S. brokerage associations, and individual brokers, were contacted in order to obtain an estimate. However, none of these organizations had an estimate of the industry size for U.S-Canada, or any ballpark figure for the level of costs.

Customs Brokerage Costs

U.S.-Canada Transactions

- Given the lack of information, the calculation approach was as follows:
 - Estimates were developed first for entries to the U.S. from Canada, and then from the U.S. into Canada.
 - For each case, an estimate of the number of entries to the country from the other was made. These estimates were based in part on information from FIS sources, and in part from broker associations.
 - Estimates of the fees per entry being charged by brokers in each country for entries from the other country were then estimated in US\$. It should be noted that Canadian brokers generally charge higher US\$ fees than U.S. brokers and this is reflected in the per entry fee estimates.
 - The number of entries times the fees then became the total brokerage cost estimate.

Customs Brokerage Costs U.S.-Canada Transactions (Millions of U.S. \$'s)

Assumption/Scenario	Minimum	Midrange	Maximum
Into USA			
# of Customs Entries*	7.753	7.753	7.753
Cost/Entry in US\$	US\$15	US\$20	US\$25
Brokerage Cost	116.3	155.1	193.8
Into Canada			
# of Customs Entries*	10.260	10.260	10.260
Cost/Entry in US\$	US\$25	US\$30	US\$35
Brokerage Cost	256.5	307.8	359.1
Total U.S. – Canada	372.8	462.9	552.9

* Believed to exclude Big 3 auto companies

Estimated Duties, Border Related Fines, Fees Imports From U.S. and Canada With Each Other

- Customs duties, border related fines, and fees, are another major cost that relates to the current border management system used by Canada and the U.S.
- These costs relate to duties for non-NAFTA conforming imports from the U.S. and Canada into each others countries, duties levied under dumping complaints and countervailing subsidy complaints; fines for various border related violations related to paperwork errors, fraud and negligence; and fees for truck entry into the U.S.
- While one would expect each of the governments to have a ready summary of these costs, this is not the case. After dozens of hours of effort, including interviews and reviews of reports from agencies such as Statistics Canada, U.S. Management and Budget, U.S. Census, Canadian Customs, Canada Revenue, the U.S. International Trade Commission, the Canadian and U.S. Embassy's in each others countries, broker trade associations, and individual brokers, we have concluded that the only way to obtain the actual number is for the two Customs agencies to run special reports tthat could not be obtained for this research effort.

Estimated Duties, Border Related Fines, Fees Imports From U.S. and Canada With Each Other

- Given the lack of specific data, the following calculation method was used:
 - Into the U.S. the estimate is based on total U.S. duties collected at northern border ports of entry which total US\$366.9 million for one year. However, this figure includes imports from Europe that enter through northern ports, and imports from other potential source countries.
 - In order to arrive at the actual duties on Canadian imports, this figure was reduced by a percentage in each of the scenarios. These percentages were based on interviews with various parties including U.S. Customs and brokers.
 - Over and above the general duties, another category was added for recently imposed dumping and/or countervailing duties on softwood lumber from Canada. The estimated duty for this category is based on last years value of softwood imports from Canada times the applicable duty of 27%, and depending on the scenario, an assumption that anywhere from 50-70% of the lumber was subject to the duties.
 - Fraud and negligence fines were obtained from U.S. Customs.
 - Truck fees for entry to the U.S., which are \$5 per truck entry, or \$100 per year, assume 1/3 of trucks pay the annual fee, and that the other 2/3 pay the per truck fee.

Estimated Duties, Border Related Fines, Fees Imports From U.S. and Canada With Each Other

- For entry to Canada, the estimate is based on published information indicating that Canada collected C\$2.9 billion in duty from all sources for the 2001-2002 fiscal year. The percentage of this relating to the U.S. was estimated by assuming a given percentage in each scenario related to imports from the U.S.
- The calculations for the total estimated duties, border related fines and fees are shown in the following table:

Estimated Duties, Border Related Fines, Fees Imports From U.S. and Canada With Each Other (Millions of US\$)

Assumption/Scenario	Minimum	Midrange	Maximum
Into USA			
All duty categories	US\$200.0	US\$250.0	US\$300.0
Softwood Lumber Duty	810.0	970.0	1130.0
Sec 1592 Fraud/Negligence	1.0	1.5	2.0
Truck Fees	<u>26.6</u>	<u>33.6</u>	<u>40.3</u>
Into USA Subtotal	1037.6	1255.1	1472.3
Into Canada			
All Duty Categories	300.0	350.0	400.0
Fraud and Negligence	<u>?</u>	<u>?</u>	<u>?</u>
Into Canada Subtotal	<u>300.0</u>	<u>350.0</u>	<u>400.0</u>
Total Canada-US	1337.6	1605.1	1872.3

Duties are rough estimates based on total U.S. duty collections at northern border ports equaling US\$366.9M, and Canadian duty collections in SW Ontario = CS1.58B. Softwood lumber duty based on US\$6.0B in U.S. imports from Canada, 27% duty and % subject to of 50, 60, 70%. US truck fees assume 1/3 of trucks pay annual \$100 fee and 2/3 pay \$5/truck crossing.

Manufacturer Customs Administration Costs

- A third feature of the current border management system involves costs related to customs administration by manufacturers.
- These costs relate to staff and information systems support necessary to manage the customs process and pay a variety of duties. In some cases firms do all work in-house, in other cases they have a small staff in-house and rely on brokers for the majority of the work. However, in either case a considerable amount of information systems support staff is required.
- The following approach was taken to estimate these costs:
 - Costs were estimated for two groups, larger companies that do a major portion of total trade, and smaller firms that do less trade. The two categories of firms have a different profile in terms of their costs as a percent of their total trade.
 - For the large top 100 firms that, according to a quote from a senior Canadian government official, represent 30% of all U.S.-Canada trade, a specific dollar expense per firm was assumed. Based on interviews with firms, and depending on the scenario, a cost of US\$5-10 million per firm was assumed, representing between .4 to .9% of their total trade, depending on the scenario.

Manufacturer Customs Administration Costs

- For the remaining firms, the total trade they conduct was calculated by subtracting the total trade assumed to be conducted by the top 100 firms (30% of the total) from the total merchandise trade, leaving 70% of the total for the small firms. For these firms customs administration costs were assumed to be from .8 to 1.1% of their total trade dollars, depending on the scenario. These percentages are somewhat higher than were assumed for the larger firms, and are based on interviews with several smaller manufacturers.
- The two categories of costs for large and smaller shippers were then added together.
- These calculations are shown in the following table:

Manufacturer Customs Administration Costs

(Billions of US\$)

Assumption/Scenario	Minimum	Midrange	Maximum
Total 2001 Merchandise Trade	US\$382.0B	US\$382.0B	US\$382.0B
Top 100 Firms = 30% of Trade	114.6B	114.6B	114.6B
Customs Admin Cost Assumed For Each Company	5.0M	7.5M	10.0M
Cost for Large Shippers	.500B	.750B	1.00B
Customs Administration % of Trade \$ for Large Shippers	.4 of 1%	.65 of 1%	.9 of 1%
Remaining Trade	267.4B	267.4B	267.4B
Assumed Customs Admin Cost as % of Trade for Small Shippers	.80 of 1%	.95 of 1%	1.1%
Cost for Small Shippers	2.13B	2.54B	2.95B
Total Customs Admin Cost	US\$2.63B	US\$3.29B	US\$3.95B

Other Border Related Costs Federal Inspection Services

Federal Inspection Services Staff Costs

- Another cost impact from the present border management strategy relates to the costs of federal inspection services (FIS) staffs located on the U.S.-Canada border.
- The costs of this staff have been calculated as follows:
 - First the number of personnel have been estimated under three scenarios, and multiplied by an average cost figure per staff member.
 - For U.S. staff, the three scenarios reflect at the minimum level – the current staff levels, at the midrange - the appropriated staff levels for 2003, and at the maximum level - the fully authorized staff level. For Canada, all three scenarios assume the current staff levels.
 - The calculations do not assume any value for support staff costs because it is assumed that even if the inspection staff was repositioned, the support staff and costs would remain in place.
- The result of these calculations are shown in the following table:

Federal Inspection Services Staff Costs (Millions of US\$)

Assumption/Scenario	Minimum (Current Staff)	Midrange (2003FY App)	Maximum (Authorized)
USA			
Border Patrol Staff #	346	662	900
Customs Staff #	1773	2153	5319
INS Staff #	<u>490</u>	<u>980</u>	<u>1470</u>
USA Staff #	2609	3795	7689
USA Staff Cost	US\$260.9	US\$379.5	US\$768.9
Canada			
Revenue Canada Staff #	<u>2400</u>	<u>2400</u>	<u>2400</u>
Revenue Canada Cost	<u>US\$192.0</u>	<u>US\$192.0</u>	<u>US\$192.0</u>
Total Canada-US	US\$452.9	US\$571.5	US\$960.9

Based on best available information on current, appropriated and authorized staff levels.
Assumes costs of US\$100,000 per U.S. staff and US\$80,000 per Canadian staff.

Cost Summaries

Transit Time and Uncertainty Related Impact Summary (Millions of US\$)

Type of Cost	Minimum	Midrange	Maximum
Transit Time/Uncertainty Costs			
Carrier Related			
Primary Inspection Transit Time	275.3	324.2	351.8
Secondary Yard Processing	602.5	755.4	908.3
Excess Plan Time	113.7	416.4	515.7
Reduced Cycles/Other	65.8	120.7	197.4
Driver Documentation/Fax Time	<u>133.5</u>	<u>250.7</u>	<u>400.9</u>
Carrier Subtotal	1190.8	1867.4	2374.1
Manufacturer Related			
Manufacturer Sourcing Benefits	1007.0	1530.0	2000.0
Extra Inventory Carrying Cost	<u>229.0</u>	<u>458.0</u>	<u>686.0</u>
Manufacturer Subtotal	<u>1236.0</u>	<u>1988.0</u>	<u>2686.0</u>
Personal Traveler	<u>96.7</u>	<u>159.0</u>	<u>209.6</u>
Transit Time/Uncertainty Subtotal	2523.5	4014.4	5269.7

General Border Costs and Grand Total (Millions of US\$)

Type of Cost	Minimum	Midrange	Maximum
General Border Costs			
Carrier Related			
General Border Administration	100.0	200.0	250.0
Cabotage	<u>100.0</u>	<u>150.0</u>	<u>333.3</u>
Carrier Subtotal	200.0	350.0	583.3
Manufacturer Related			
Brokerage Costs	372.8	462.9	552.9
Duties, Border Fines, and Fees	1337.6	1605.1	1872.3
Customs Administration	<u>2630.0</u>	<u>3290.0</u>	<u>3950.0</u>
Manufacturer Subtotal	4340.4	5358.0	6375.2
Federal Inspection Services Staff	<u>452.9</u>	<u>571.5</u>	<u>960.9</u>
General Border Subtotal	<u>4993.3</u>	<u>6279.5</u>	<u>7919.4</u>
Transit Time and Uncertainty Subtotal	<u>2523.5</u>	<u>4014.4</u>	<u>5269.7</u>
Total U.S.-Canada Border Costs	7516.8	10293.9	13189.1