

A SUMMARY OF THE FINDINGS OF STUDIES REGARDING A MAINE EAST-WEST HIGHWAY

Prepared by
Maine Department of Transportation and
Maine State Planning Office
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SUMMARY OF FINDINGS

Purpose of Study

The Maine Department of Transportation and Maine State Planning Office have completed studies in response to a law enacted by the 118th Maine Legislature requiring a study to determine the costs and economic benefits relative to the development of an east-west highway in Maine, linking to the east with the Canadian Maritime Provinces and to the west with the larger markets of Quebec, Ontario, and the Midwestern United States. The basic objective of these studies was to provide policy makers with a sound base of knowledge regarding the costs, benefits, and potential impacts associated with both the improvement of Maine's existing east-west highways as well as the construction of a new 4-lane limited access highway. This document summarizes the findings of these studies.

East-West Highway Corridors

Five alternative corridors were selected on which to focus the economic research and engineering and environmental assessments; three upgrade alternatives, and two 4-lane limited access alternatives on new alignment. The corridors were selected to represent a broad range of alternatives serving the northern, central, and southern regions of the State. The two 4-lane limited access corridors (D & E) presented and discussed should not be accepted or presumed as the only and final selections, but as a demonstration of possible alternatives. Any assumptions as to precise location and scope of improvement are premature and beyond the scope of these studies.

Corridor Upgrade Alternatives

Corridor "A" - The Alternate Trans-Maine Trail Beginning at the Canadian border in Vanceboro, proceeding westerly via Route 6 through Lincoln, Milo, Dover-Foxcroft, and Guilford to Abbot, then westerly via Route 16 to Bingham. The trail then proceeds northerly along Route 201 to Jackman and Sandy Bay at the Canadian Border. (Includes Routes 6, 16 & 201).

Corridor "B" - The East-West Highway Beginning at the Maine/New Brunswick border proceeding westward along Route 9 to 46 in East Eddington. The corridor continues southerly along Route 46 to Route 1A in East Holden, then westerly along Route 1A to I-395 in Brewer, connecting with I-95 at or near Bangor. It then continues southwesterly along existing I-95, leaving I-95 in Newport. From this

point, it continues westerly along route 2 to the Maine/New Hampshire border at Gilead. (Includes Routes 9, 46, 1A, I-395, I-95 & 2)

Corridor "C" - The East-West Highway (Alternate) Beginning at the Maine/New Brunswick border proceeding westward along Route 9 to Route 46 in East Eddington. The corridor continues southerly along Route 46 to Route 1A in East Holden, then westerly along Route 1A to I-395 in Brewer, connecting with I-95 at or near Bangor. It then continues southwesterly along existing I-95, leaving I-95 in Newport. From this point, it continues westerly along Route 2 to Route 27 in Farmington. It then continues northwesterly along Route 27 to the Maine/Quebec border at Coburn Gore, linking Sherbrooke and Montreal via Quebec Route 10. (Includes Routes 9, 46, 1A, I-395, I-95, 2 and 27)

Corridors on New Alignment

Corridor "D" A limited access 4-lane highway, predominately on new alignment, beginning at the Maine/New Brunswick border, at a location somewhere in the vicinity of the Calais/Baileyville area connecting to Saint John, Fredericton, and Moncton via NB Routes 1 and 2. The corridor then proceeds westward along or south of Route 9, connecting with I-95 at or near Bangor, and continues southwesterly along existing I-95, leaving I-95 anywhere between Newport and Augusta. From this point, it continues northwesterly to the Maine/Quebec border at or near Coburn Gore, linking Sherbrooke and Montreal via Quebec Route 10.

Corridor "E" A limited access 4-lane highway, predominately on new alignment beginning at the Maine/New Brunswick border, at a location somewhere in the vicinity of Calais/Baileyville connecting to Saint John, Fredericton and Moncton via NB Routes 1&2. The corridor then proceeds westward along or south of Route 9, connecting with I-95 at or near Bangor, and continues southerly along existing I-95/I-495, leaving I-95/I-495 anywhere between Augusta and Gray. It then continues generally northwesterly to the Route 2 corridor crossing into New Hampshire at or near Gilead, linking New Hampshire, Vermont, and Montreal via Route 2 and I-89.

Key Findings

The following section provides a brief summary of the key findings of the several technical reports (see bibliography) developed in support of the subject study.

Traffic

Current average annual daily traffic (AADT) volumes on most of the major rural east-west highway segments are relatively light. 1999 volumes on the rural portions of the existing east-west highways range from a low of 400 vehicles per day to a high of approximately 9,000. Traffic volumes on these highways increase substantially as they pass through the "built-up" areas of the many communities situated along the east-west corridors.

Auto travel from Canada to Maine has declined over the past 5 years while truck travel has steadily increased. In 1992, approximately 2,997,000 autos crossed into Maine at the five principle east-west border crossings (Calais, Houlton, Jackman, Coburn Gore, Vanceboro). By 1997, this number decreased

to 2,192,000. On the other hand, trucks entering Maine from Canada increased from 193,000 in 1992 to 302,000 in 1997. Presently, 12,800 vehicles per day cross the US/Canadian border (both directions) at these locations, of these, 1,500 are commercial trucks.

The volume of existing east-west travel through Maine is relatively minor. A trip origin-destination survey conducted at the US/Canadian border at Calais/St. Stephen indicates that approximately 8% of the auto travel is east-west oriented - to or from Quebec, Ontario, New Hampshire, Vermont or upstate New York. East-west truck travel is negligible. Most east-west traffic on Route 9 is destined to the I-95 corridor.

Statewide travel is forecast to grow at a modest rate through the year 2030. By the year 2030, Maine's population is expected to grow to 1.48 million people while its employment grows to approximately 850,000 jobs. Based on this growth, overall statewide travel is forecast to grow at a rate of approximately 0.73 percent per year.

Travel between Maine and Canada is forecast to grow at a greater rate than overall statewide travel. This forecast explicitly assumes a significant appreciation in the Canadian dollar to a level not seen in more than fifteen years. However, based on an assumption that the US/Canadian exchange rate approximates its 30-year average by the year 2015 and beyond, auto trips between Maine and the Maritimes will grow by nearly 50 percent by the year 2030 while truck travel grows at an even faster rate - nearly 100 percent in some cases. Auto trips between Southern Maine Coast and the Province of Quebec are forecast to grow by 50 percent as truck travel increases by nearly 50 percent.

Improvements on the five conceptual east-west highway corridors produce reductions or savings to system-wide vehicle-hours of travel. Because the alternative corridors provide a faster route to travel, within and through the State, they all result in a reduction of vehicle-hours of travel. The greatest reductions are produced by Corridors D & E.

Statewide travel is forecast to grow further as the result of the increased economic activity generated by each of the five east-west alternative corridors. This additional "induced" travel ranges from 6,800 trips per day (Corridor A) to 24,400 trips per day (Corridor D), representing a 0.13% to 0.45% increase in overall statewide travel, respectively. Most of this induced growth is the result of increased auto travel within Maine. The greatest percentage increase in travel is associated with auto travel between Maine and Canada, ranging from 5.3 percent (Corridor A) to 9.8 percent (Corridor E).

Upgraded east-west highway corridors are expected to carry increased volumes in 2030, compared to the no-build condition. An upgraded Route 9 is projected to carry 1,600 (Corridor B) to 2,100 (Corridor C) more vehicles on an average daily basis compared to the no-build condition. Similar increases in daily volumes of 1,600 to 2,300 are projected for I-95 between Bangor and Newport. An upgraded Route 27, is also projected to carry 1,000 to 1,600 additional vehicles per day by 2030. The Corridor B upgrade of Route 2 is expected to have a minimal impact on year 2030 AADT of only 100 vehicles per day (compared to the no-build condition) at the New Hampshire border.

Construction of a new 4-lane limited access highway between Calais and Bangor would result in a substantial diversion of traffic off existing Routes 1 and 9. A new 4-lane alignment is projected to carry an AADT of 11,400 to 11,600 in 2030. Such a route would remove nearly all of the existing traffic off of Route 9, as well as cut projected future traffic on Route 1 by roughly 2,300 vehicles per day below current levels. These projects indicate that a new four lane alignment east of Bangor could cause significant bypass effects of Route 1 commercial activity in the coastal communities between Bangor and Calais.

Truck travel on Maine roads is projected to increase substantially over the forecast period. Total annual vehicle-hours of truck travel (VHT) on Maine highways are projected to reach 26.8 million in 2015, and grow to 32.6 million hours by 2030. Of these totals, trips through Maine should account for just under 28% of system-wide truck VHT (roughly 7.5 million hours) by 2015. Due to the expected rapid growth of Atlantic Canada freight movements to US markets, though truck VHT is expected to grow to 32% of the system-wide total (reaching 10.5 million) by 2030. The remaining majority of truck VHT, roughly 19.3 million hours in 2015 and growing to 22.1 million hours in 2030, represents truck travel to and/or from Maine industries.

Year 2030 traffic flow on Maine's existing east-west highway corridors is expected to remain relatively uncongested. The capacity of the rural segments of the existing east-west corridors is sufficient to accommodate year 2030 traffic volumes at a satisfactory level of service.

Traffic congestion is common in the urban compact areas of many of the communities located along the existing east-west highways. This congestion will become more of a concern as traffic volumes continue to grow. Significant improvements, such as localized bypasses, may be required to improve traffic flow through these areas.

The diversion of Canadian travel into and through Maine can depend upon a number of factors including; delays at the border, cost of fuel, truck weight limits, and possible toll rates. From a survey of shippers, conducted as part of this study, it was found that these four specific issues are not of significant importance in terms of being an impediment to commerce. Congestion and delay at the border generated the most concern from respondents followed by the cost of tolls, differential truck weights, and the cost of fuel.

Engineering and Environmental Assessment

Corridor Upgrades

In assessing the highway upgrade needs associated with Corridors A through C a set of standards relative to roadway design, safety, travel speed, and capacity were adopted that would ideally result in an efficient 2-lane highway system capable of sustaining travel speeds of 55 mph or greater. The resulting system would be a high-type design with 12-foot travel lanes, 8-foot paved shoulders, periodic passing lanes, truck climbing lanes, turn lanes at all major intersections, and in some instances, new highway segments.

A significant portion of Maine's existing east-west highways do not meet the standards established for this study and require some level of improvement to bring them to the desired standard. Of the approximately 865 miles of existing east-west highway corridors identified in this study, seventy percent have been identified as in need of improvement, at a cost of nearly \$494 million (\$290 million - total reconstruction; \$64 million - minor widening; \$62 million operational enhancements; \$77 million - potential new construction which includes a new border crossing in the Calais area, a connector between I-395 and Route 9, and a relief route around the greater Skowhegan area).

Upgrading existing east-west highway corridors will result in a modest decrease in border-to-border travel time. An improved Corridor A would save approximately 54 minutes in a trip from Vanceboro to Sandy Bay. An upgraded Corridor B would save 18 minutes in travel time between Calais and Gilead, and an upgraded Corridor C would result in a 21 minute saving on a trip between Calais and Coburn Gore.

4- Lane Limited Access Corridors

Both 4-lane limited access corridors (D & E) would have medians separating opposing lanes of travel, at-grade intersections at the junctions of important major streets and roads (no grade separated interchanges), would provide access to abutting property only at pre-designated locations, and be designed to support travel speeds of 65 mph.

Both Corridors D and E would reduce the time to travel across the State. Corridor D would save approximately 81 minutes in a typical trip from Calais to Coburn Gore, while Corridor E would save 39 minutes in a trip from Calais to Gilead.

Corridor D would be approximately 227 miles in length. Corridor E, which utilizes more of Maine's Interstate highway, would be approximately 156 miles.

Not all of these corridors would be constructed on new alignment. There will be opportunities along the corridors, where because of little or no significant conflict with adjoining land development, two additional travel lanes can be added to existing 2-lane roadway segments (twinning). In doing this, development rights along the existing right-of-way would be acquired to assure the resulting facility functions as a limited access highway.

The ultimate decision to proceed with the development a new 4-lane limited access highway will be subject to many considerations. The economic and social effect of bypassing communities and potential impacts on the natural and man-made environment are but a few of these considerations. The study has identified a number of potential significant resources of concern along the five conceptual corridors. These resources must be considered for total avoidance. Additionally, there are several unorganized townships along the conceptual corridors fall under the planning jurisdiction of Maine's Land Use Regulation Commission (LURC) which maintains infrastructure goals and policies intended to protect the natural character of remote areas. These important issues will be addressed through the MDOT transportation decision-making processes required by Maine's Sensible Transportation Policy Act as well as the National Environmental Policy Act.

Cost

The cost of highway improvements associated with the five alternative corridors varies significantly. The cost to upgrade existing east-west corridors is estimated to range from a low of \$151,000,000 (Corridor A) to a high of \$208,000,000 (Corridor C). The costs associated with the two limited access corridors studied range from \$796,000,000 (Corridor E) to \$1,170,000,000 (Corridor D). These costs are generalized costs which include roadway construction, bridge construction, engineering, right of way, and environmental mitigation.

Other Plan Elements

Regardless of which alternative is ultimately selected, there are a number of additional opportunities that should be considered to complement east-west highway improvements. Among these are, corridor management options (right of way preservation, advance acquisition of right of way, and access management) and corridor signage and scenic enhancements. Additionally, there would be opportunities to improve the connections between the east-west highway and Maine's passenger and freight transportation hubs.

Financing Options

It is understood that the financing required for new east-west highway infrastructure cannot detract from the maintenance and upkeep of Maine's existing roadways. It is therefore imperative that new sources and opportunities for funding be explored. A number of innovative financing alternatives have been researched. It is apparent from the results of that research that no single financing option can reasonably and practically satisfy the total capital need associated with the extent of improvement contemplated. The ultimate project financing "package" would most likely consist of a variety of finance options.

Because toll revenue is considered to be an integral part of many of the project financing alternatives studied, a separate analysis of the financial feasibility of constructing, operating and maintaining a new east-west toll road corridor through Maine has been completed. The following summarizes the findings of that analysis.

Toll Financing Feasibility

The preliminary assessment of toll feasibility was limited to four of the five conceptual corridors (B, C, D, and E). Corridor A was not included because it generated much less travel compared to the other four. An "open barrier" type of toll collection was recommended. Under this concept, a fixed toll rate is assessed in each direction of travel at mainline plazas spaced at generally equal distances. Plazas were located along the corridors to capture the majority of traffic, but taking into consideration the need to minimize the potential for toll diversion. Passenger car rates of between \$0.50 and \$1.50 were tested at each plaza. Truck tolls varied from \$1.50 to \$4.50 per plaza. At the low end, this represents a passenger car per mile rate of up to \$0.020 per mile for through trips in each corridor. At the high end, it

represents passenger car per mile rates of up to \$0.050. These ranges encompass rates assessed on similar toll facilities in the region.

Corridors D and E experienced a significant amount of toll diversion, especially at the higher rates tested. Toll evasion estimates were much lower with Corridors B and C due to the general lack of direct competing alternative routes. Over 70 percent of toll-free traffic remained in Corridors B and C at the highest rate tested, while only about 55 percent remained in Corridors D and E.

At the highest rates tested, Corridor D was estimated to produce the most annual toll revenue (\$24.9 million in 2015), with Corridor B producing the second highest (\$20.8 million in 2015). By the year 2030, this annual toll revenue is forecast to grow to approximately \$34.2 million and \$25.3 million, respectively.

The cost to staff, maintain, and operate the proposed toll plazas is estimated to range from \$2.5 million per year (Corridor E) to \$3.5 million per year (Corridor B).

Net toll revenues were compared to estimated debt service requirements for each corridor assuming both General Obligation Bond and Revenue Bond financing.

Assuming General Obligation bond financing, annual debt service requirements range from \$14.5 million per year (Corridor B) to \$94.7 million (Corridor D). When Revenue bonds are considered, the range increases from \$19.8 million to \$127.8 million, respectively.

Only Corridor B proved to be financially feasible beginning in 2015, but only when General Obligation Bond financing was assumed. Toll revenue based on the high end rates were assumed in this analysis since the lower toll rates fell far short of financial feasibility.

The revenue derived from Corridors D and E meets less than a quarter of debt service requirements in 2015, and only about one-third by 2030.

When all maintenance and operations costs are included, Corridor B is estimated to generate about 5.5 percent more net bond proceeds (General Obligation Bonds) than are required by capital costs.

Assuming General Obligation Bonds, the "bonding capacity" associated with Corridors D and E covers only about 20 percent of the estimated construction capital outlay. The vast majority of toll roads in the United States provide a minimum of four travel lanes. While it is technically feasible to convert an existing two-lane road (Corridors B and C) to a toll facility, there are currently no major two-lane toll facilities in the United States. The last major two-lane toll corridor was the West Virginia Turnpike. By 1987, it was converted to a four-lane facility.

The results of the toll feasibility analysis summarized above should be considered preliminary in nature. It was intended to provide a relative indication of financial feasibility of the four corridors compared to one another. The decision to proceed with a capital program to improve Maine's east-west highways will require a more comprehensive analysis of financing options than is presented here.

Other Funding

The legislation directing this study also required the MDOT to make application for funds provided by the 1998 reauthorization of the federal transportation programs (TEA-21) for the purpose of planning and improving border crossing infrastructure and national trade corridors.

On January 13, 1999, the States of Maine, New Hampshire, and Vermont filed a joint application for funding improvements along the Route 9 and US Route 2 corridor under two new federal capital programs; the National Corridor Planning & Development Program and the Coordinated Border Infrastructure Program. As a result, Maine received \$1 million for federal fiscal year 1999. This funding will be directed to a project to complete the preliminary engineering and environmental studies for a new international border crossing in the Calais, Maine/St. Stephen, New Brunswick, area.

The Department will continue to pursue funding under these two new programs for future east-west corridor improvements.

Linkages to Other States and Provinces

This study was developed with the awareness that highway improvement plans in other states and provinces will have an ultimate effect on state and regional highway system continuity as well as on the volume of traffic flow into and through Maine.

New Hampshire / Vermont - both States plan to continue to upgrade US Route 2 with shoulders and occasional truck passing lanes. Neither State currently has plans to expand the US Route 2 corridor beyond the 2 lanes that presently exist.

Quebec - the Ministry of Transportation has no plans to improve the Sherbrooke to Coburn Gore connection (Route 212). The Ministry, over the next 5 to 20 years, plans to build in phases a limited access 2-lane highway (route 173) between Saint Joseph de Beauce and St. Georges.

New Brunswick - the New Brunswick Ministry of Transportation has plans to improve the Route 1 corridor from St. John to St. Stephen resulting in a 2 to 4-lane limited access highway to Maine's border in Calais.

Economic Impact Analysis

The purpose of the economic impact analysis was to forecast and compare the likely effects of each of the proposed alternative corridors on the Maine economy. The period of study ranged through the construction and first 15 years of operation of the proposed improvements, concluding in 2030. The scope of the analysis included the following research elements:

1. Trends and forecasts for cross-border trade and commodity movements into and through Maine and Atlantic Canada;
2. Trends and forecasts of economic and population growth within the States, Provinces and US/Canadian urban areas that would be served by improved east-west transportation access through Maine;

3. Analysis and forecasting of the effects of improved highway access on future tourism travel to and through Maine;
4. Analysis of business opinion concerning the need for and likely response to improved east-west transportation within the State;
5. Forecasting of the likely secondary and cumulative economic impacts of the highway's construction, resulting cost savings and productivity effects on Maine industries, and impacts on tourist visitation to Maine; and
6. Analysis of analogous highway corridors in other comparable regions to Central and Northern Maine, for purposes of verifying the reasonableness of the forecast results.

The scope of the economic impact analysis was limited to the State of Maine only and did not address potential changes in economic activity that might also occur in Atlantic Canada, Quebec and the Northeastern U.S. The analysis therefore provides only a partial projection of the total economic impact of improved east-west transportation through Maine and should be evaluated in that context.

Market Trends

1. Although US/Canada trade has grown rapidly in recent years, very little of this increased activity has flowed through Maine. Maine's opportunities to increase its share of Canadian trade appear to be linked to Canada's growing industrial centers in Southern Ontario and Southwestern Quebec. Significant characteristics of US/Canada trade include the following:

- Canada is a net exporter to the US. Canada has enjoyed a long-standing and growing trade surplus with the US. Measured in constant 1992 US dollars, the value of Canada's exports to the US grew at a 5.3% annual rate from 1988 through 1995, while imports from the US grew by 3.3% per year. Canada's trade surplus with the US has also increased in real terms, from \$11.3 billion in 1988 to \$30.6 billion in 1995. (These totals are expressed in 1992 constant US dollars.)
- In monetary terms, trucks carry the dominant share of US-Canada trade. In 1995, trucks carried more than 66% of the dollar value of Canadian exports to the US and 90% of the value of US exports to Canada. Rail is used most heavily for the transportation of finished automobiles; wood, pulp and paper; and metal products. Trucks are the dominant transport mode for most other commodities.
- Trade between the US and Canada is concentrated within a few commodity groups and is heavily dominated by the automotive industry. Transportation equipment accounted for more than 30% (\$66.8 billion) of the total value of US/Canada trade in 1995, and more than 52% of Canada's \$30+ billion trade surplus with the US. In addition to transportation equipment, the two other categories of commodities with high levels of US-Canada trade were machinery & electronics (\$50.5 billion) and wood, pulp and paper products (\$24.8 billion). Together these three commodity groups accounted for nearly 61% of the total value of US-Canada trade in 1995.

- Because Canada's automotive industry is headquartered in Southern Ontario, the vast majority of cross border trade flows through Ontario. More than 86% of the total value of Eastern Canada's US exports, flowed through Ontario border crossings, compared to 11.8% for Quebec and 1.9% for New Brunswick. The value of US products imported into eastern Canada was similarly distributed, with 91% entering through Ontario, 7.9% through Quebec and only 1.1% entering through New Brunswick.
- The monetary value and growth of bilateral trade between Northern New England, New Brunswick and Quebec is very modest compared to the other border regions. Of the approximate \$61 billion increase (real growth) in US-Canada trade between 1988 and 1995, more than half has flowed between Michigan and Ontario, 29% has flowed between Northern/Western New York State and Ontario/Québec and 19% has been captured by the western border regions. Less than one percent has flowed through New Brunswick and Maine.
- The vast majority of the bilateral trade between Northern New England, New Brunswick and Quebec, measured in dollar value, consists of Canadian exports to the US. Although only a small fraction of total US/Canada trade flows between Northern New England and New Brunswick/Quebec, the value of this trade still totaled nearly \$3.0 billion in 1995. The total value of cross-border trade between these regions also grew by roughly \$480 million in real terms from 1988 to 1995. However, nearly 72% of that value consisted of Canadian exports to the US.
- US/Canada trade is projected to continue to grow through 2015. A forecasting model of US/Canadian trade, developed for the Eastern Border Transportation Coalition in 1997, projects that bilateral trade will grow at an average annual rate of between 4% to 7% over the next 20 years. The impact of these trade flows is expected to cause cross-border truck traffic along the Northern New England border with New Brunswick/Quebec to grow at an average annual rate of 1.5 to 2.8% to the year 2015.

2. Maine's larger export sectors, including agricultural, paper, and wood products industries, are areas where Canada enjoys strong trade surpluses with the US. Due in part to this factor, Maine has a large trade deficit with Canada.

- The US has a trade surplus with Canada in relatively few major commodity groups. Machinery and electronics is the single commodity group in which the US had a major trade surplus with Canada (of more than \$12.2 billion) in 1995. The US also had modest trade surpluses in chemicals (\$1.35 billion), textiles (\$600 million), rubber and plastics (\$390 million) and stone, ceramic and glass products (\$280 million). In other major commodity groups, Canada had substantial trade surpluses with the US. These groups included transportation equipment (\$16 billion), wood, pulp & paper products (\$13.6 billion), minerals (\$12.9 billion), metal products (\$3.8 billion) and agricultural products (\$580 million).
- Maine recently ranked 17 th among all US States as a destination for Canadian goods, but was not ranked among the top 20 US States in terms of exports to Canada. Maine's trade deficit with Canada has also grown rapidly in recent years. Measured in US dollars, Maine imported nearly \$1.9 billion worth of Canadian products in 1998, while exporting less than \$584 million. Trade imbalances occurred in all provinces except Ontario. Maine's estimated 1998 trade deficit with Canada totaled nearly \$1.3 billion, compared to a deficit of \$572 million in 1993.

- Despite this trade imbalance, Canada is still Maine's most important export market, ahead of Europe and Asia. The majority of Maine's exports to Canada are destined for Quebec and Ontario. Trend data indicate that more than two-thirds of Maine's exports, measured in terms of value, are shipped "westbound" to Quebec, Ontario and western Canada. By contrast, roughly 60% of the State's Canadian imports are received from the east via the Atlantic Provinces.

- The majority of Maine's trade with Canada (both imports and exports) is in natural resource-based commodities. Maine's Canadian imports include large quantities of energy products (petroleum, coal and electricity) and wood pulp imported from New Brunswick, along with softwood lumber imports from Quebec. The value of imported wood pulp, lumber, news print, fuel and electricity represents nearly 47% of Maine's total Canadian imports.

- In contrast to Maine's largest exported commodities, New England's Canadian exports are concentrated in high technology industries. These industries include equipment, electronic components, fabricated machinery parts and assemblies, medical and diagnostic equipment, aerospace equipment. In addition to technology-based goods, seafood and agricultural products are also important exports. Due to the high values associated with these products, Massachusetts, Connecticut and Vermont had higher Canadian exports than Maine in 1998.

3. The dominant share of Canada's economic and population growth over the next 20 years is expected to occur in the major urban markets located to the west of Maine. By comparison, growth prospects for the Atlantic Provinces, particularly areas outside of Metropolitan Halifax, are very limited.

- Like the U.S., Canada's employment growth over the past decade has been led by high-technology, high-knowledge-intensive industries, both in the manufacturing and service sectors. Nation-wide, Canada's high-technology employment has expanded by more than 1.0 million (23%) since 1987. Over the same period, employment in medium- and low-technology sectors, including natural resource-based industries, was largely flat. Most of the Canadian population centers located near Maine are still dependent on medium- and low-technology industries.

- The Atlantic Provinces represent only minor percentage of Canada's economy. Canadian GDP totaled just under \$798 billion (\$Can) in 1996. The four Atlantic Provinces, combined, contributed less than 6% to Canada's GDP, while Quebec and Ontario represented 22% and 41%, respectively. The combined GDP of the four Atlantic Provinces in 1996 totaled \$47.7 billion (\$Can), less than 15% of Ontario's GDP of \$323 billion.

- Technological trends in the Canadian economy favor high-tech durable goods manufacturing over traditional industries. Electrical products, communications, business services, wholesale trade and chemical manufacturing industries are all projected to grow by more than 3% annually over the next decade. Because most of these "high-growth" industries are concentrated in Ontario, overall growth forecasts for Ontario are more favorable than other parts of the country.

- Ontario is projected to remain the growth engine of the Canadian economy. A significant structural characteristic of Canada's economy is the fact that 53% of Canada's entire high-tech job base is located

within the nation's seven largest metropolitan areas. Consistent with these trends, employment and population forecasts indicate that Canada's major urban centers, and Toronto in particular, will grow faster than its smaller cities and non-metropolitan areas for the foreseeable future.

- Rising labor productivity and high rates of capital investment are key to future Canadian economic growth. The continued competitiveness of Canada's high-tech industries will depend upon maintaining rapid technological change. These demands are projected to generate high levels of investment in industrial machinery and equipment, as well as demand for business services. This demand should create growing export opportunities for U.S. firms.
- Canada's inflation rate is projected to remain below the US over the near term. Canadian inflation is expected to average 1.7% between 1998 and 2000, compared to a 2.6% average rate in the U.S. This factor, along with Canada's positive trade balance, should help to stabilize and eventually strengthen the Canadian dollar relative to the U.S. These developments should work to reduce currency barriers which have constrained Canadian travel and spending in the U.S. during most of the 1990s. As a popular destination for Canadian travel, Maine would obviously benefit from such a development.
- In the aggregate, the population of Eastern Canada has been growing faster than New England over the past several years. However, more than 73% of the total population gain recorded in Eastern Canada since 1992 has occurred within Ontario. According to Statistics Canada, the combined populations of the six Eastern Provinces totaled more than 21.2 million in 1997. Ontario's growth from 1992 to 1997 was roughly 761,000, nearly 4 times the recorded population increase in New England over the same period. The Province of Quebec also experienced significant population growth of more than 259,000 (a 3.6% increase). Nova Scotia's population also grew by 23,000 (3.6%) from 1992 to 1997, roughly 3 times the total gain recorded in the State of Maine. New Brunswick and PEI experienced nominal gains of 8,900 and 5,800, respectively, while Newfoundland's population declined by more than 19,900.
- The six Eastern Provinces had an estimated combined total employment of more than 9.6 million in 1997. Roughly 56% of that total job base is located in Ontario. Quebec's economy is roughly the size of Massachusetts, while Ontario's economy is larger than Massachusetts, Connecticut and Rhode Island, combined. Collectively, the four Atlantic Provinces had a total employment base of 960,000 in 1997. This total was roughly 14% lower than the number of jobs in Maine and New Hampshire combined. Maine's economy has grown at a faster rate than the Atlantic Provinces (with the exception of PEI) since 1992.
- Economic growth in Ontario and Quebec should far exceed the Atlantic Provinces over the next decade. Quebec's economy is projected to add 350,000 jobs by 2008. In addition, Quebec's population is expected to grow at a rate of 0.4% per year, expanding by more than 292,000 and creating more than 274,000 households by 2008. Job growth in Ontario is forecast at a 1.8% annual rate through 2008, which is projected to create more than 1.1 million jobs by the end of the forecast. Population and households are projected to grow at corresponding rates of 1.1% and 1.5% per year, respectively. The remaining Atlantic Provinces are projected to achieve a very modest expansion of less than 65,000 jobs (8.5%) by 2008, with more than 60% of that projected job growth occurring in Nova Scotia. The

remaining Atlantic Provinces are also expected to experience minimal net gains in population and households over the period.

4. Nearly all of the northeastern states are projected to slow in terms of population and job growth over the next two decades. Because population and economic growth are the primary determinants of travel demand, these projections suggest that rates of traffic growth will also slow in the future. Population and employment trends and forecasts for Maine and 12 other Northeastern US States were obtained from the U.S. Department of Commerce, Bureau of Economic Analysis (BEA). The source provided annual measurements of employment by industry, population and Gross State Product from 1969 to the present, as well as forecasts to the year 2045. The BEA forecast for Maine was reasonably consistent to internal forecasts generated by the Maine State Planning Office. Highlights from that forecast are summarized below:

- Growth in total employment among northeastern U.S. states during the 1990s shows significantly more volatility than population, due to the varying impacts and rates of recovery from the recession of 1990-91. The mid-western and northern New England states have exhibited the fastest rates of job growth during the 1990s, ranging from 0.8% to 1.4% annually, while Connecticut, Rhode Island and New York have had the slowest job growth (0.2% to 0.5% per year). Maine's annual rate of job growth during the 1990s is expected to average 0.8%.
- According to BEA's forecasts, the northeastern states are projected to maintain very modest annual growth rates in total employment of between 0.5% to 1.0% from 2000 to 2015. Employment growth for the New England States is projected between 0.8% and 1.0% annually. Future job growth in New York and New Jersey is projected to accelerate slightly in comparison to the past decade, while Ohio, Indiana, Michigan, Illinois and Pennsylvania are projected to experience a slowdown in job growth. BEA's longer range employment outlook (2015 to 2025) calls for job growth to slow throughout the northeastern states, to annual rates of 0.4% or less.
- Maine's recent and projected economic growth actually compare favorably in percentage terms to most other States in the Northeastern US. In total, Maine's population is expected to grow by 71,000 from 1990 to 2000 and 275,000 (21.5%) between 2000 and 2025. BEA also forecasts that Maine's population will grow at a slightly faster annual rate from 2000 to 2015 (averaging 0.8% per year) that it did during the 1990s. The 0.6% rate of annual population growth in Maine during the 1990s is in the middle of the range of the other northeastern states, while the 0.8% annual growth rate forecast from 2000 to 2015 is higher than most of the Northeast.
- In percentage terms, the outlook for the population growth in much of the Northeast US is slower than Ontario and comparable to Quebec. Annual rates of population growth for the Northeast US states are expected to fall within a range of 0.5% to 0.9% from 2000 to 2015. Canada's population is projected to expand at average annual rates of between 0.7% and 1.4% to the year 2016. Under a "medium growth" scenario within this range, Ontario's population is projected to grow by nearly 1.5% per year and Quebec by 0.7%. The remaining Atlantic Provinces are projected to experience relatively nominal population growth of well under 0.5% per year.

- Maine's employment growth during the 1990s has varied greatly among the State's 16 Counties. During the post-recession recovery from 1992 to 1997, seven Maine counties either lost employment or experienced growth rates below 1% per year, five counties generated job gains ranging from 1% to 2% and the remaining counties generated annual job growth exceeding 2% per year. Freight Traffic and Commodity Movements.

5. The flow of existing commodity traffic into and through Maine is primarily in a north-south direction. Despite Canada's importance to Maine as an export market, the volume (weight) of Maine commodities shipped to Canadian destinations is still modest compared to other US markets.

- In 1997, total Maine cargo carried by rail, truck, or water, to/from the rest of the US, was estimated at 14.3 million tons (outbound) and 8.6 million tons (inbound), respectively. Roughly 79% of outbound tonnage and 46% of the inbound tonnage was carried by truck, a total of nearly 15.2 million tons moved in both directions.

- Total annual commodity movements to and from Maine will grow steadily by the time an east-west highway comes on line. Total Maine tonnage to/from the US is forecast to grow at an average annual rate of 2.5% (outbound) and 2.0% (inbound) through 2015, growing to nearly 34.7 million tons per year by the end of the forecast. Trucks are projected to maintain their current share of outbound movements, but steadily gain market share of inbound freight movements over the forecast period. Total freight carried by truck will exceed 23.8 million tons in both directions by 2015, an increase of more than 8.6 million tons over 1997 levels. (1 Forecast year 2015 is assumed to coincide with the construction completion date for an east-west highway.)

- Freight movements from Atlantic Canada to the US are also projected to grow steadily through 2015. In 1997, 25.6 million tons of freight left Atlantic Canada bound for the US, with 81% by water, 13% by truck and 6% by rail. Inbound freight from the US is of considerably lower volume at 2.7 million tons in 1997. Total Atlantic Canada freight movements to the US are projected to increase at a rapid 6.2% average annual rate, while freight from the US is projected to rise at a slower 4.9% annual rate. Water borne cargo is projected to retain the dominant modal share of these movements, due in part to the expected long-term expansion of the Port of Halifax.

- Total bi-directional truck freight carried to, from and through Maine is projected to grow by almost 1.0 million tons per year through 2015. Table 1 summarizes current (1997) and projected (2015) bidirectional truck freight movements between Maine-US, Maine-Atlantic Canada and Atlantic Canada-US origin destination pairs, that are likely to be moved through Maine. In addition, the table shows combined Canada-Canada truck and rail flows that are potential candidates for diversion through Maine if an improved east-west transportation link were to be developed. As shown, total bidirectional truck freight that is already likely to move to, from or through Maine, is forecast to grow from 22.6 million tons to 40.0 million tons by 2015. This represents an average growth rate of 970,000 tons (3.2%) per year over the forecast period.

Table 1: Summary of Projected Truck Freight Movements to, Through and Around Maine, 1997-2015

Annual Freight Movements by Origin-Destination Pairs	Bi-directional flow (Millions of Tons)		Growth: 1997-2015		
	1997	2018	Total Change	Change Average	Annual Growth Rate
Maine-US	15.2	23.8	8.6	0.48	2.5%
Maine-Canada	4.8	9.2	4.4	0.25	3.7%
Canada-US, Through Maine	2.6	6.9	4.3	0.24	5.6%
Subtotal: Truck Freight to, from and through Maine:	22.6	40.0	17.4	0.97	3.2%
Potential Diversion: Canada to Canada Truck & Rail	11.4	14.7	3.3	0.18	1.4%
Total E-W Highway Potential	34.0	54.7	20.6	1.15	2.7%

- The potential to divert Canada-Canada freight movements through Maine is modest relative to projected truck volumes that are already likely to move through the State. Roughly 11.4 million tons of truck and rail freight moved between Atlantic Canada and the Central and Western Provinces in 1997. This volume is projected to grow to 14.7 million tons by 2015, an average of 180,000 tons (1.4%) per year over the forecast period. Some portion of this freight could also be diverted onto a Maine East-West Highway. As indicated in the table however, current and projected truck freight generated by O-D pairs that are already likely to move to, from or through Maine, greatly exceed Canada-Canada flows in both the aggregate and in their projected rates of growth over the forecast period.

Tourism Visitation

6. Improving east-west transportation access should have a positive impact on tourist travel to and through Maine.

- Findings from extensive interviews with tourism leaders from various regions of Maine, suggest that east-west highway improvements would have support from those in the tourism industry. The majority of tourism leaders interviewed for this analysis, expressed the opinion that an east-west highway will benefit Maine tourism overall, by improving access to the state for both Canadians and northern New England residents. Some tourism leaders also believe that an east-west highway could facilitate the movement of tourists once in Maine, perhaps encouraging them to extend their stays.

- Tourism professionals believe that increased visitation resulting from an east-west highway is more likely to benefit existing Canadian destination spots in southern and coastal Maine, as opposed to regions where the corridors would be located. Several tourist destinations in Central and Northern Maine do not currently attract significant numbers of Canadian visitors. Some local tourism leaders interviewed from these areas are doubtful that an east-west highway would significantly increase

Canadian visitation. The primary reason given for low Canadian tourism currently was not highway access, but rather the availability of comparable attractions (i.e. lakes, mountains and wilderness areas) in Canada.

- In addition to interviews with state tourism officials, a telephone survey of 2,000 households was conducted to assess the tourism potential of a new east-west highway. The specific objectives of the research were to (1) determine the amount of travel to and through the State of Maine from these key market areas in 1997 and 1998; (2) evaluate the characteristics of these trips to and through Maine and determine where people traveled, how long they stayed and what routes they used; and (3) test the theoretical impact of improved highway access and travel time savings on future visitation to the state. Survey interviews were conducted in telephone exchanges located in and near Quebec City, Montreal, Toronto; New Brunswick's major cities (Saint John, Moncton and Fredericton); Halifax, Nova Scotia, Northern New Hampshire and Vermont and Upstate New York. Summary findings from the survey include the following:

Current Travel Patterns to Maine

- In total, residents of the market areas surveyed took an average of 0.28 trips to Maine (per household) in 1997 and 1998.
- The average yields an estimated 365,201 trips to Maine in 1997 and 1998 (combined).
 - > 58% of these trips were in 1998, and
 - > 42% were in 1997
 - > 23% of these trips were day trips, and
 - > 77% were overnight trips.
- The average number of people on each of these trips to Maine was 2.85.
- The average number of nights visitors stayed in Maine during these trips was 2.88.
- The most frequently mentioned primary destinations in Maine were:
 - > Portland,
 - > Old Orchard Beach, and
 - > Calais.
 - > Among all destinations listed, the majority were in York County and Cumberland County.
- An estimated 2.8 million person-nights were spent in Maine in 1997 and 1998 among tourists living in these key market areas.
- Residents of these same markets plan to take 0.15 trips (per household) to Maine in 1999.

- This average yields an estimated 209,000 trips to Maine in 1999, about the same number as in 1998.
- Of those who indicate that they plan to travel to Maine in 1999, 59% had not traveled to Maine in 1997 or 1998.

Current Travel Patterns THROUGH Maine

- Key market residents took an average of 0.13 trips (per household) through Maine on their way to other states or provinces in 1997 and 1998.

- The average yields an estimated 323,000 trips through Maine.

> 51% of those trips were taken in 1997, and

> 49% were taken in 1998.

- The average number of people on these trips through Maine was 2.79.

- The average number of nights spent in Maine during these trips was 1.27.

- The primary destinations on these trips through Maine were:

> Nova Scotia,

> Florida, and

> New York.

- 61% of the primary destinations were in the United States, and 39% were in Canada.

- Among Canadian visitors making trips through Maine on their way to other locations,

> 76% were traveling to destinations in the United States, and

> 24% were traveling to destinations in Canada.

- An estimated 876,000 person-nights were spent in Maine in 1997 and 1998 on these trips through Maine.

Effects of an East-West Highway on Travel

- When presented with the concept of highway improvements, 15% of key market residents indicate that they would take more trips to Maine if the highway improvements and travel time savings were to occur.

- Respondents indicated that they would expect to make 346,000 more trips to Maine if travel times to Bangor were reduced by amounts that could be achieved by an east-west highway.

- Yet, of those who indicated that the highway improvements would lead them to take more trips to Maine:

- > 67% had indicated earlier in the survey that they did not plan to travel to Maine in 1999, and

- > 82% had not traveled to Maine in 1997 or 1998.

- Reducing long travel times is apparently appealing to those who have not recently visited Maine, intriguing them to say they'll do so. Due to the fact that much of the increase in visits would occur among those who do not have recent experience traveling to the state, it may be difficult to predict where their destinations would be or if their response might change should a specific corridor be defined.

- Survey respondents indicate that the proposed highway improvements will be an incentive for a sizable proportion of people to travel to Maine more often. It is important to note that the survey found significant levels of recent travel to and through Maine, even from markets as far west as Toronto. A significant percentage of these respondents, about 15%, indicated that their travel patterns to or through Maine could be influenced by an improved east-west transportation route within the state. Among some respondents, even very modest time savings, relative to the total trip length required to reach and return from Maine, would be sufficient to induce them to make more trips to or through the state. These results are encouraging and suggest that an east west highway would generate an increase in tourism travel to Maine.

- The combined effects of travel time savings on potential trips to and through Maine, along with the associated number of person-nights spent in the state, are summarized in Table 2. These estimates reflect the combined impacts of reduced travel times and improved highway access to/through Maine on all of the market areas surveyed. If travel time savings indicated in the survey instruments could be simultaneously provided to all of the market areas surveyed, the collective impact produces an increase of roughly 1.3 million trips 6.1 million visitor days.

Table 2: Respondents' Reactions to Potential Time Savings Associated with Conceptual East-West Highway Corridors

Impact on Travel to Maine	
Increase in Trips to Maine	346,000
Increase in Person-Nights Spent in Maine	2,968,000
Impact on Travel through Maine	
Increase in Trips through Maine	954,000
Increase in Person-Nights Spent in Maine	3,192,000
Total Potential Impacts on to- and through-travel	
Number of Trips	1.3 million
Number of Person-Nights Spent in Maine	6.1 million

- It should be noted that when surveying each target market, the potential time savings presented to survey respondents reflected the maximum savings associated with the conceptual corridor which best served that particular region. No single east-west corridor is capable of providing comparable time savings to all of the markets sampled by the survey. Therefore, applying these survey results to project actual annual visitation to Maine, to any single conceptual east-west highway corridor, must be approached very cautiously. In addition, respondents were only asked to anticipate their travel plans over the next year; projecting these figures to continual travel over a longer period of time is difficult. Also, respondents were not presented with specific highway corridors; rather, they were given one single time saving to one particular destination. Respondents may have mistakenly assumed that this same time savings would apply to all of their normal destinations in Maine. Finally, it is not uncommon to discount respondents' stated intentions by large percentages in order to arrive at the actual actions they may undertake. All of these factors need to be considered when converting the survey findings to actual projections of market response to each individual proposed east-west highway corridor.

Business Response

7. According to representatives of Maine industries who responded to the East-West Highway Survey, improving east-west transportation access should have modest benefits to Maine employers. The business survey effort returned data from a significant sample of Maine's largest companies. The survey returned an equal number of responses from both northern and southern regions of the state and included representation among several industry groups. Survey highlights include the following:

- The survey effort specifically targeted companies that would be most likely to have an interest in the proposed east-west highway. The survey was administered to a cross-section of the State's largest companies, in those industries which are most sensitive to transportation issues. In total, just over 40% of the sample, more than 500 companies, were located in northern Maine while the balance of nearly 800 firms were located in the more heavily populated southern region.
- A well-represented cross section of responses was received, both geographically and among industry groups. More than 150 responses were received, an 11.5% return on from the initial mailing list. Returns were equally distributed between the northern and southern regions, with 76 returns received from each. In total, these companies have more than 19,600 full-time employees, including more than 16,300 workers at the locations represented in the survey.
- Survey respondents already have significant numbers of customers and suppliers in regions that could be made more accessible by an east-west highway. More than 49% of respondents, statewide, have customers and/or suppliers in Atlantic Canada, 47% in Quebec, 26% in Ontario/Western Canada, 55% in northern NH/VT, 56% in Western NY and 60% in the Midwest and Western US. These percentages indicate that at least half of the statewide sample currently does business in regions that could be made more accessible to the interior Maine, via an east-west highway corridor.
- More Maine firms characterize their markets to the south and west as "growing" than Canadian markets. For respondents with Atlantic Canada customers, less than 38% characterized recent sales trends as "growing", while higher percentages of respondents characterized their sales to Quebec (45%)

and Ontario (58%) as growing. By comparison, more than 70% of firms with customers in Southern NE, the Middle-Atlantic and Midwest US have recently experienced growing sales to those regions. Among Maine companies with Canadian customers, the fact that more describe sales as "declining or flat" than growing, is perhaps a reflection of recent unfavorable exchange rates, as was indicated elsewhere in the survey.

- Roughly a third of all respondents appear to view Canada as a potential growth market in the future. Maine firms are primarily looking to other US regions for sales growth. In the short term, higher percentages of respondents expect to increase sales within Maine, to Southern New England and the Mid-Atlantic States, the Midwestern US, and Northern NH/VT, than to Canadian market. Also, the percentage of Maine firms that are unlikely to do more business in Canada, is much larger than the percentage of firms that expect to increase their Canadian sales. There is very little difference in expectations between southern and northern Maine companies on this issue.
- The survey findings suggest that improved westbound highway access may be more important for freight traffic originating in Maine than eastbound access. Numbers of outbound truck shipments westbound to Ontario and Quebec, exceed eastbound shipments to Atlantic Canada by a factor of 2.3 to 1. Westbound shipments to Upstate NY, the Midwest and Western US also exceed the volumes headed for Ontario and Quebec. It is also interesting to note that total monthly shipments leaving northern Maine greatly exceed southern Maine.
- Rail does not currently carry significant volumes of outbound freight to those regions that would be serviced by an east-west highway. Respondents ship virtually no product to Canada and limited volumes westbound to US destinations, by rail.
- Although a minority of Maine firms appear to encounter problems when shipping or receiving goods to/from the regions listed in the survey, problems are significantly greater in those areas which could be improved by an east-west highway. The largest percentage of firms (more than 25%) reported encountering very frequent or frequent problems, when sending or receiving shipments to/from other locations within Central and Northern Maine. The percentage of Maine companies that encounter transportation problems when shipping to/from Atlantic Canada (21%) or Quebec (22%), is also higher than the other regions listed. The smallest percentage of companies report encountering transportation problems, when shipping/receiving freight to or from Southern New England and points south (6.3%) and Upstate New York (9.5%).
- No single east-west corridor clearly emerges as a "preferred" alternative among survey respondents. When respondents were asked to rank each conceptual corridor on the basis of its likely level of use by that company and its suppliers, the reported average for the entire statewide sample did not exceed 3 (the mid-point) for any corridor. Even Northern Maine respondents, composite scores for all Corridors were also below 3. The percentage of respondents ranking each Conceptual Corridor a "1" (low use), exceeded those indicating "5" (high use) in each case, even when responses were isolated for northern and southern Maine.

- As could be expected, there are regional differences in projected levels of use and "preference" among the five Corridors. Among Northern Maine firms, the 4-lane Calais to Coburn Gore Corridor (D) ranked highest, by a slight margin over the Route 2 and Route 9 upgrade (Corridor B) from Calais to Gilead. Southern Maine firms indicated that they would be most likely to use the four-lane Corridor (E) linking Lewiston-Auburn to the NH Border at Gilead. It is also interesting to note that the incremental improvement of the Calais to Coburn Gore route from a 2-lane upgrade (Corridor C) to a four-lane highway (Corridor D), did not produce a large increase in the anticipated use of that route, among either statewide or Northern Maine respondents. When asked to rank the Corridors, with 1 signifying first preference, among all respondents statewide, Corridors C & D ranked first with the same score, followed by B, E and A. Among respondents located in Northern Maine, the order was similar, with Corridor A moving from 5 to 3. Southern Maine firms, ranked Corridors E and B one and two.

- When presented with a list of possible economic benefits that might arise from the construction of their "preferred" east-west highway corridor, about 20% to 40% of the respondents actually expected their companies to benefit. Nearly 39% of respondents statewide believe that their preferred corridor would be "highly likely" or "likely" to lower their firms' shipping costs within Maine, compared to a slightly smaller portion of the sample (35%) who did not expect a lowering of shipping costs. When asked if the highway would increase the firms' cost competitiveness, these percentages were reversed. A smaller percentage of companies (25%) believe that their preferred corridors would help them do more business with Canada, and fewer still (21%) believed that their preferred routes would facilitate commuting for employees. Because of the geographic dispersion of survey respondents, the maximum percentage of firms that are likely to derive economic benefits from any single Conceptual Corridor reduces these reported ratios by more than half.

- An east-west highway is not likely to cause a significant movement of firms within the State. Just under 23% of respondents, indicated that they would be "highly likely" or "likely" to expand operations at their existing facilities if their "preferred" east west corridor was built. The potential of a new highway to induce movement of existing firms around the state appears to be minimal, as less than 2% indicated that they might move closer to a new highway. About 12% thought that they might expand at another location within the state, 6.2% might expand in Canada and less than 3% might expand elsewhere in the US.

- From the current perspective of Maine businesses who responded to this survey, the State's failure to improve east-west transportation routes would not appear to have a negative influence on future expansion decisions. More than 24% of respondents indicated that they will be "highly likely or likely" to expand at their current locations, absent of the highway's construction. This percentage was slightly higher than the response to the preceding question, which assumed the existence of a new highway. A slightly smaller percentage of firms indicated that they would be likely to expand elsewhere in Maine if no highway improvements were made, fewer firms indicated that they would be likely to expand in Canada, absent of an east-west highway, but more may decide to expand elsewhere in the US.

- Survey respondents are split concerning where an east-west highway should rank as a priority among other transportation needs over the next 20 years. Statewide, a minority of respondents with an opinion

on the issue, ranked the east-west highway as either a "highest" or high"priority over the next 20 years, with the 4-lane Corridors (35%) ranking lower among respondents than a 2-lane improvement (43.2%). Significant numbers also ranked either option as either "low or not a priority", 31.5% for the 2-lane and 43.5% for the 4-lane corridors. Among Northern Maine businesses, a majority (52.5%) rank the two-lane Corridors as either a highest or high priority, compared to only 24.6% who hold the opposite view. It is interesting to note that the four-lane Corridors rank lower than the two-lane even among northern Maine firms, with only 39.7% characterizing them as a highest or high priority, compared to 41% who characterized them as a low priority or not a priority.

- Among impediments to increased Canada trade faced by Maine companies, transportation issues rank lower than economic and regulatory issues. Respondents were asked to rate ten listed impediments to increased Canadian trade in order of importance from 1 (none) to 5 (high). Among those, regulations/red tape ranked highest (3.46), followed by exchange rates (3.44) and competition from other US & Canadian firms (3.30). Among other factors that ranked above 3.0, "shipping costs" ranked 4th (3.24) followed by Canadian economic conditions (3.19), and border crossing/Canadian Customs (3.09). The quality of "highway access" to Canada scored 3.04, 7th among the ten issues listed.

- Respondents would accept limited tolling of an east-west highway. Among persons with opinions, more than half indicated that toll rates of less than 10¢ per mile would not negatively influence their usage of the highway. However, substantial resistance to tolls is indicated at higher rates among those persons with an opinion. At an average toll rate of 16¢-20¢ per mile, the combined percentage of respondents with opinions who would be "very likely" to reduce travel or "would not use" the highway, rises to nearly 64%. At average toll rates above 20¢ per mile, the majority of respondents with opinions would not use the highway.

Economic Impacts

8. Inputs to the economic impact model were estimated for each alternative corridor, using reasonable assumptions concerning (1) vehicle hours of truck travel (and resulting transportation costs) saved by Maine industries (2) the amount of increased tourism travel to Maine generated by each corridor and (3) highway construction and maintenance costs and the methods of financing used.

Vehicle Hours of Truck Travel Saved

- Annual hours of truck travel on Maine roads are projected to increase significantly over the forecast period. Total annual vehicle hours of truck travel (VHT) on Maine highways are projected to reach 26.8 million in 2015, and grow to 32.6 million hours by 2030. Of these totals, external-to-external trips through Maine should account for just under 28% of system-wide truck VHT (roughly 7.5 million hours) by 2015. Due to the expected rapid growth of Atlantic Canada freight movements to US markets, external-to-external VHT is expected to grow to 32% of the system-wide total (reaching 10.5 million hours) by 2030. The remaining majority of VHT, roughly 19.3 million hours in 2015 and growing to 22.1 million hours in 2030, represents truck travel to and/or from Maine industries.

- The five conceptual east-west highway corridors produce reductions or savings to system-wide truck VHT, which form the basis for estimating transportation cost savings to both the trucking industry itself, and to other industries that incur shipping costs. Highway investments produce productivity savings for industries by reducing travel times and distances associated with the transportation of freight. Estimates of productivity savings are made by comparing total vehicle hours of travel (VHT) for trucks under the no-build condition, against each of the five conceptual corridors. In 2015, annual VHT savings (for trucks) range from just under 10,000 hours for Corridor A (a 0.04% savings) to a maximum of nearly 520,300 hours (a 2.2% savings) under Corridor D. However, the percentage of total VHT savings which accrue to external-to-external traffic also varies greatly by each corridor. The percentage of VHT savings captured by external-to-external traffic ranges from a low of 16.9% (Corridor B) to a maximum of nearly 56% of the total under Corridor D. By 2030, more than 60% of total VHT savings generated by Corridor D are projected to benefit external-to-external users of that corridor, rather than Maine industries.
- The balance of VHT savings not accruing to through traffic, are expected to lower transportation costs to Maine industries. In the aggregate, VHT savings to Maine industries (in 2015) range from a low of 7,700 hours for Corridor A, to a maximum of roughly 230,000 hours for Corridor D. These savings represent a marginal percentage reduction to the total volume of truck VHT servicing Maine industries of between 0.04% (Corridor A) and 1.2% (Corridor D).
- The additional incremental VHT savings gained by enhancing the Calais to Coburn Gore Corridor from a two lane upgrade to four-lane limited access highway, primarily benefit external traffic. A comparison of the VHT savings offered by Corridor D compared to Corridor C, illustrates the incremental value of improving the Calais to Coburn Gore route from an upgraded two-lane route to a four-lane limited access highway. The resulting incremental reduction in VHT to trucking activity that services Maine industries, totals roughly 173,000 hours in 2015 and grows to 214,000 hours by 2030. VHT savings to external-to-external traffic from the same incremental improvement, totals nearly 269,000 hours in 2015 and grows to 396,000 hours by 2030. In 2015, Corridor D is expected to provide a near 3.9% time savings to external-to-external truck traffic (i.e. New Brunswick to Boston or Montreal), compared to a less than 1.2% time savings to trucks which service Maine-based industries.

Increased Tourism

- Canadians are an important component of Maine's tourism market. According to research prepared by a Canadian survey firm, 46 million recreational and business travelers visited Maine in 1997, spending \$5.1 billion while traveling in the State. About 6.7 million of these 1997 visitors, representing roughly 12 percent of Maine's total tourism market, were from Canada. Canadians spent an estimated \$440 million in Maine during that year.
- The vast majority of annual visitors to Maine (36.6 million in 1997) are day trippers. Roughly 45% of these day trippers (16.4 million in 1997) originated from regions to the south of the State. Maine residents made an additional 14.5 million recreational day trips (40% of the total) within the state and Canadian visitors represented the remaining 15% of the day trip market. An estimated 5.7 million Canadians made day trips to Maine in 1997, with 88% of these visits originating from New Brunswick.

- Canadians visitors made up a slightly smaller share (11%) of Maine's 9.4 million overnight visitor market in 1997. An estimated 1.1 million Canadians made overnight visits to Maine, compared 1.7 million Maine residents and 6.6 million visitors from other parts of the US.
- The five east-west corridors are projected to increase Maine tourism within a range of roughly 7.5 percent to 14 percent over the estimated 8.8 million visitor days currently generated from Canadian and northern NH, VT and NY markets. Estimates of potential induced visitor days associated each individual corridor fall within a range of 659,000 (Corridor A) to 1.3 million (Corridor D). The vast majority of induced travel from each corridor is projected to consist of day trips.

Construction Costs and Financing

- Construction costs of the alternative corridors vary substantially and thus produce widely varying economic impacts during the construction period. The estimated construction costs of each corridor, in 1999 dollars, used in this analysis were:

Corridor A: \$ 151.54 million

Corridor B: \$ 164.88 million

Corridor C: \$ 207.99 million

Corridor D: \$1,170.00 million

Corridor E: \$ 796.00 million

For purposes of analysis, impacts were forecast on the assumption that the federal government will pay 80% of the construction cost and the state will pay the remaining 20% of the costs through an increase in fuel taxes.

Economic Impact Forecasts

1. Construction of any of the proposed east-west corridors will have the effect of modestly increasing the overall size of the Maine economy. The economic effects of each corridor in 2010 (the approximate mid-point of the construction cycle), 2020 (five years after the assumed highway completion date) and 2030 (the last forecast year) are summarized in Table 3 on the following page.

- The maximum number of jobs created by any corridor total just under 3,700 in 2030. This high end of the impact range is associated with the four-lane Calais to Coburn Gore Corridor D. The more southerly four-lane Corridor E similarly produces roughly 3,200 jobs by the end of the forecast period. The two-lane upgrade alternatives are projected to produce smaller job gains ranging from less than 500 jobs (Corridor A) to just over 1,400 jobs (Corridor B). Impacts on Gross State Product (GSP) and population are proportional and are also shown in Table 3.
- For most corridors, the Hancock-Washington and Penobscot-Piscataquis regions receive the largest share of economic impacts after completion of the highway. By 2030, these regions receive roughly 65%

of the total job benefits from Corridor A, and 47% to 48% of the benefits from C and D, respectively. This percentage is lower for the more southerly alignments, falling to 41% of the total from Corridor B and 36% of the from Corridor E.

- Economic Impacts are not confined to where the corridors are located. There are also large employment effects on "other counties", particularly in the Corridor D and E cases. These effects result primarily from a high degree of growth from tourism in Waldo-Knox, Cumberland, and York counties, which occur due to the assumption that the distribution of increased tourist activity from the east-west highway will be directed towards traditional tourist destinations.

Table 3: Summary Comparison of Statewide Economic Impacts in 2010, 2020, and 2030: Conceptual East-West Highway Corridors

Indicator	Net Change		
	2010	2020	2030
Impact on Total Employment			
Corridor A	438	522	484
Corridor B	455	1,216	1,433
Corridor C	500	2,764	3,685
Corridor D	2,128	2,764	3,685
Corridor E	1,490	2,466	3,226
Impact on Gross State Product (\$92)			
Corridor A	\$16.6	\$21.0	\$22.50
Corridor B	\$17.9	\$59.1	\$84.1
Corridor C	\$19.9	\$5.9	\$61.4
Corridor D	\$89.5	\$139.3	\$215.9
Corridor E	\$69.5	\$126.2	\$192.0
Impact on Population			
Corridor A	364	787	827
Corridor B	258	1,584	2,347
Corridor C	287	1,384	1,936
Corridor D	1,373	4,292	6,312
Corridor E	916	3,678	5,484

- An east-west highway will be helpful to Maine manufacturers, but it will not by itself substantially increase manufacturing jobs. The employment effects of the highway will occur primarily in non-manufacturing industries. An analysis of the distribution of employment impacts by industry shows that early job growth will primarily be in construction, as would be expected, and later shift to other non-manufacturing industries, primarily in trade and services. There are relatively small effects on manufacturing. Maximum employment impacts in 2030 show an increase of only 172 manufacturing employees (for Corridor D). This is because, on average, the trucking costs likely to be affected by the highway account for only 1.5% of production costs for manufacturing companies, and the highway reduces this level of costs by at most 5.4%.

- Increased tourism is initially responsible for most of the projected economic impacts of the east-west corridors. Over time, transportation cost savings to other industries will become more important. In 2015, the year after construction is completed, tourism accounts for nearly 80% of the employment impacts and slightly more than 70% of the GSP impacts for Corridor D. However, this proportion steadily decreases over time, until by 2030 the production cost efficiencies created by the highway, reduce the tourist proportion to less than 30% of the employment impacts and only 20% of the GSP effects. This pattern is due to the fact that the spending effects of increased tourism are relatively immediate, while productivity changes involve time-lag effects.

- The use of alternative federal/state financing assumptions appears to have a minimal influence on the highway's total economic impacts by the conclusion of the forecast. By 2030, the projected differences in total employment varies by only 3% to 4% when using a 50/50 federal/state funding split, compared to the 80/20 split assumed in the initial forecast. It does not appear therefore, that a state share of costs as high as 50%, paid for with higher gas taxes, would significantly reduce the positive long-term economic impacts of the highway. Similarly, it can be concluded that the use of more optimistic financing assumptions would not dramatically increase those impacts.

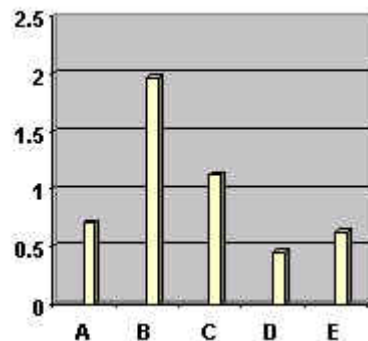
10. A full benefit-cost analysis of the East-West Highway Corridors, considering the full range of environmental and user costs and benefits, was beyond the scope of this report. However, when compared using basic measures of economic efficiency, the two-lane upgrade alternatives B and C, rank much higher than the four-lane corridors.

- When compared on a "cost-efficiency" basis, the four-lane divided highway options do not appear to generate sufficient additional economic growth to justify their higher costs. Consequently, the upgrade of existing highways may be a more efficient investment from the perspective of benefitting the Maine economy. The five corridors were compared on both an incremental GSP/cost ratio and a cost per job ratio. Table 4 presents the costs per job created, using the discounted present value (at a 7% discount rate) of construction and maintenance expenditures over the period 2005-2030, divided by the number of additional jobs created in 2015 (at the beginning of the full operation period) and in 2030 (the end of the analytic period). Using this measure, the cost per job for all corridors is very high. Corridor B, although still high, has the lowest cost per job created in both 2015 and 2030, while Corridors D, E, and A have the highest cost per job. The four lane Corridors D and E are by far the most expensive in per job costs. Even with the higher job creation of these alternatives their cost per job in 2030 are still very high, in the range of \$190,000 to \$230,000 per job.

Table 4: Cost Per Job Created

Corridor	2015	2030
A	\$228, 000	\$242, 749
B	\$123, 549	\$90,010
C	\$173, 828	\$138, 230
D	\$439, 239	\$229, 691
E	\$340, 161	\$190, 220

• Figure 1 provides a similar present-value comparison of the five corridors, measuring the incremental gain in Gross State Product (GSP) generated per dollar invested to construct and operate each corridor. By this measure Corridor D, which generates the largest number of jobs at the conclusion of the forecast, has the lowest incremental GSP to cost ratio of less than 0.5. The ratio of economic return per dollar invested in the Corridor B upgrade is roughly four times greater at a ratio of 2.0. Similarly, the two-lane upgrade of the Calais to Coburn Gore Corridor C, provides roughly twice the economic return to the Maine economy per dollar invested, than would the construction of a new four-lane alignment along what is essentially the same route, as depicted by Corridor D.



11. When balancing upside and downside risks to the economic forecasts, the likelihood that the economic impacts of an east-west highway will be smaller than those forecast in this report, appear to outweigh the likelihood that they will be larger. The economic impact analysis therefore suggests the following conclusions:

- a. Improving east-west transportation corridors through Maine will have a modest positive long term effect on the economies of those regions where the corridors are located, as well as a modest positive impact on the state as a whole.
- b. From the perspective of Maine's economy alone, the substantially higher costs of constructing a four-lane divided highway on a new alignment, (Corridors D and E), do not appear to be justified, based upon the resulting modest incremental increase in economic benefits they provide to the State. This judgement is reinforced by the downside risks to the forecast, as well as the potential for those new alignments to cause harmful "bypass effects" on some communities which are located on or near

existing routes. Although the results of the case study evaluation (Phase IV) need to be considered before a final determination can be made, the evidence presented in this report is clearly unfavorable to the four-lane alternatives.

c. This analysis indicates that emphasis from this point forward, should be directed toward upgrades of existing highways. Based on the assumptions used in this analysis, the proposed Route 2/9 Upgrade (Corridor B) appears to provide the greatest economic impacts relative to the costs involved. The Route 9/27 Upgrade (Corridor C) is slightly less favorable by comparison, but may merit continued evaluation either as a stand alone-concept or in concert with Corridor B.

d. Finally, additional economic analysis of the benefits and costs of any corridor improvements of a substantial nature, should be undertaken as more information, in particular information regarding environmental costs and impacts, becomes available.

- When approached from the perspective of all potential users and beneficiaries of the highway, rather than just Mainers, the total employment impacts of a four-lane corridor could be substantially higher than estimated in this report. From the broader perspective of total benefits to both Maine and Canada, the total economic impacts of Corridor D could have reasonably been forecasted in the range of 5,000 to 10,000 jobs by 2030, and perhaps even higher. Whether the total employment impacts fall toward the lower or upper end of that range would depend on a number of additional factors not addressed in this report. Most important among these is the extent to which economic benefits to regions surrounding Maine would be, on-balance, a positive advantage or competitive threat to Maine's economy. The comparable natures of the economies of Maine and Atlantic Canada certainly suggest that some competitive effects would occur. However, the threat of increased competition is more likely to be outweighed by the inherent value of the access improvements to both regions.

12. Development patterns following the construction of Interstates 89 and 91 in rural sections of Northern Vermont and New Hampshire, as well as Maine's experience following the Construction of I-95 between Bangor and Houlton, indicate that those highway investments have not substantially changed the economic base of their respective regions. To gain further insight on the potential effects that a new limited access highway such as the East-West corridor in Maine might have on transportation and economics, two case studies were completed for other similar corridors in New England. Specifically, the project team investigated transportation and economic trends before and after construction of Interstate 91, from Brattleboro, Vermont to the Canadian border, and Interstate 89 from Concord, New Hampshire to the Vermont/Canadian border. These corridors are particularly relevant because they provide interstate connections for several small and mid-sized northeastern cities to/from the Montreal market.

- Interstates I-89 and I-91 serve regions which are comparable to Central and Northern Maine, provide similar highway connections to Montreal, and have an extended period of operations spanning roughly 30 years. I-89 was constructed between 1960 and 1970. The New Hampshire length of I-89 was constructed in three major sections with the sections being completed in 1960, 1965 and 1968. The Vermont length of I-89 was constructed in several sections between 1961 and 1970. The Vermont length

of I-91 was constructed in several sections between 1958 and 1978. The stretch south of White River Junction was completed first, between 1958 and 1966.

- The construction of I-89 and I-91 enhanced access considerably between the northeastern United States and Canada. The population and employment centers served by these routes are also considerably closer to Montreal than the City of Bangor would be after construction of an east-west highway. As shown by the mileage estimates in Table 5, all of the larger economic and population centers along these corridors are within 250 miles or an approximate 4½ hour drive from Montreal.

Table 5 Distances Between Montreal and Corridor Study Cities Location Approximate Mileage

St. Albans, VT (I-89)	69
Burlington, VT (I-89)	98
Montpelier, VT (I-89)	140
St. Johnsbury, VT (I-91)	136
Brattleboro, VT (I-91)	248
White River Junction, VT (I-89/I-91)	188
Concord, NH (I-89)	259
For Comparison: Bangor, ME	290

- Historical data indicate that travel demand accelerated after completion of I-89 and I-91. Similarly, traffic along both corridors has since grown at a faster rate than nearby secondary routes. In the first decade after completion, annual traffic growth on I-89 and I-91 averaged roughly 2 percentage points higher than volume growth which occurred along existing routes during the decade prior to construction. During the first decade after opening, traffic growth along I-89 and I-91 was also roughly double the rates which occurred along secondary routes, which provide a reasonable "control" measure of baseline travel demand in each State. If economic activity is assumed to accompany growing traffic volumes, one would expect to find evidence along the I-89 and I-91 corridors.

- Despite the relatively high rates of traffic growth which immediately followed the opening of I-89 and I-91, current volumes are somewhat comparable to I-95 through Maine. This is particularly true of the more rural northern segments of each corridor, near the Canadian border. Daily traffic demands on I-89 range from a low of 8,000 vehicles per day (vpd) near the Canadian border to 30,700 vpd in the more urbanized area of Lebanon, NH, and 43,100 vpd in Burlington, VT. Traffic on the more rural sections of the corridor range from 8,000 to 13,000 vpd. Utilization of I-91 is considerably lower, with the interstate carrying 3,100 to 3,700 vpd in its northern section, approaching the Canadian border, to a high of 23,500 vehicles per day in the vicinity of Brattleboro. By comparison, traffic counts along I-95 near Bangor are in

the 27,000 to 31,000 range, and decline to 2,000 to 4,000 vpd near the Canadian border. Volumes on Route 9 near Calais are in the 7,600 vpd range, comparable to I-89 in the St. Albans area. Given the fact that a Maine East-West Highway (at Coburn Gore) would also connect to Sherbrooke (like I-91), and would lie further from Montreal at its western terminus, one would expect its future traffic characteristics at the Canadian Border to be more comparable to those observed along the northern segments of I-91 rather than I-89, which also lies within the commuter shed of Burlington, VT.

- Despite their proximity to Montreal and its population of 3.5 million, border crossings at I-89 and I-91 have grown at a slower rate than overall traffic. Annualized growth rates at these crossings has also been substantially less than either Houlton and Calais. From 1984 to 1994, the overall growth rate on the northern segment of I-89 was 3.6 percent while the Highgate border crossing point showed a growth rate of 1.5 percent, less than half of the roadway traffic volume growth rate. Similarly, the growth rate on the northern segment of I-91 was 4.1 percent while the Derby Line border crossing showed a growth rate of only 2.9 percent, about two-thirds of the roadway traffic volume growth rate. Overall, traffic volume growth at the Maine border crossings was greater than at the Vermont crossings during that same period. The Houlton, Maine border crossing showed a traffic volume growth rate of about 5.1%, greatly outpacing the 0.7% growth rate for traffic volumes along the I-95 corridor north of Millinocket. Despite the absence of an interstate connection at Calais, this border crossing had the highest volume and also showed one of the highest growth rates (4.4%) during the 1984-1994 period.

- Development along the two interstate corridors is focused at significant interchange points and in the vicinity of population centers that pre-existed the highways. Much of the I-89 and I-91 corridors remain rural today, nearly three decades since the highways' completion. The most common type of development along these corridors is that of highway-related services such as fast-food establishments and gas stations. Many of the interchanges along these routes show this kind of development, while some have no commercial or industrial development at all. A few locations, notably near traditional economic centers such as White River Junction, Vermont, and near the larger corridor cities such as Burlington, Montpelier, and Brattleboro, Vermont, and Concord, New Hampshire, there is more significant development near the interstate corridors. This development contains travel services, regional services, and in some cases, office, residential and other commercial activity. The final type of development is not directly related to the interstate corridor, but is enabled by these facilities. This type of development is tourism-related commercial development in town centers and near other attractions along these corridors, such as ski areas. Many service signs present on the highways direct motorists to area attractions and tourist destinations. Undoubtedly, these facilities have benefitted to some degree from the increased visibility that the interstates provide.

- Rates of population growth in the counties serviced by I-89 and I-91 have been roughly comparable to Statewide averages since 1969. Analysis of 8 counties (3 NH, 5 VT) along the I-89 corridor found that population growth has averaged 1.3% annually from 1969 through 1996 period, while the VT counties along the I-91 corridor grew by 1% per year over the same period. Comparable population growth rates for NH and VT were 1.8% and 1.1%, respectively. The more urban counties near Concord, NH (Merrimack-1.7%), Lebanon, NH (Grafton-1.4%) and Burlington, VT (Chittenden-1.4%) experienced the fastest rates of growth during the period. Population growth in 5 of the counties serviced by I-89 and I-

91 averaged less than 1% annually over the period. For comparison, Penobscot County's population grew by 0.5% over this time frame.

- Similarly, rates of employment growth in the counties serviced by I-89 and I-91 has been roughly comparable to Statewide averages since 1969. An analysis of the counties along the I-89 corridor found that employment growth has averaged 2.3% per year from 1969 through 1996, while the VT counties along the I-91 corridor have expanded employment by 1.1% per year. Comparable job growth in NH and VT was 2.9% and 2.0%, respectively. The more urban counties near Concord, NH (Merrimack-2.7%), Lebanon, NH (Grafton-2.6%) and Burlington, VT (Chittenden-2.9%) experienced the fastest rates of growth during the period. Employment growth in 4 of the counties serviced by I-89 and I-91 averaged less than 1% annually over the period. For comparison, Penobscot County's annual rate of job growth was 1.5% over this time frame.
- Closer analysis of employment data indicate that Maine Counties have only recently begun to lag those served by I-89 and I-91. An analysis of county-level job growth over the 28 year period found that most of the disparities between Northern and Southern Maine Counties, as well as Northern Maine and comparable counties in Northern NH and VT, have emerged since the late 1980s. Prior to that time northern Maine's compared favorably to the I-89 and I-91 corridors (particularly the northern-most segments of those corridors) in terms of job growth. This trend suggests that reasons other than highway access are responsible for the modestly differential growth rates.
- Population projections prepared by NH and VT indicate that several of the counties serviced by the I-89 and I-91 are expected to experience minimal growth through 2015. Windsor, Washington and Orleans County are all projected to lose population from 1990 to 2015. Significant population losses are also projected for several of the urban centers served by these corridors, including St. Albans (-19%), Brattleboro (-14%), Springfield (-31%), St. Johnsbury (-26%) and Montpelier (-22%). (Values in parentheses indicate the total projected population decline between 1990 and 2015.)
- Because of their respective locations at the intersections of two interstates, St. Johnsbury VT, and Lebanon/Hartford NH/VT might have been expected to experience a period of substantial economic growth and transformation following the construction of I-89 and I-91. Evidence suggests that this has not been the case. Lebanon/Hartford (White River Jct.), located at the intersections of I-89 and I-91, maintains one of the lowest unemployment rates in the region but remains relatively small in terms of total population and employment. Annual rates of job growth in this region have been marginally higher than the respective averages for NH and VT since 1980. St. Johnsbury, located at the intersections of I-91, I-93 and US Route 2, has generally under-performed the Vermont economy over the past 20 years. Despite its strategic location, St. Johnsbury's labor market is below 15,000 and job growth has been negligible since 1980. Based on a comparison of the two locations, the superior economic performance of Lebanon/Hartford is largely explained by the nearby presence of Dartmouth College in Hanover, NH. The economy of St. Johnsbury, which is similar to Northern Maine and dominated by natural resource industries, has been unable to overcome structural changes to its economy, despite its superior transportation assets.

- Analysis of business location patterns along the I-89 and I-91 corridors has found little evidence of Canadian investment along these corridors. Data searches were conducted using Dun&Bradstreet, to identify the existence of Canadian-owned companies and the presence of transportation and distribution firms along the I-89 and I-91 corridors. The analysis identified very limited levels of investment over the past 20 years. The influence of Canadian investment emanating from Montreal was negligible, particularly beyond 100 miles of the border.

Conclusions

As summarized above, any of the alternative East West corridor investments are projected to provide modest economic benefits to Maine's economy. More specifically, the analysis reached the following conclusions.

- The much higher costs of new four-lane highways do not appear justified by their somewhat higher economic impacts.
- Continued exploration of the upgrade alternatives appears to be justified. Corridor B generates the highest positive economic impact for the investment made.
- The overall economic impacts of an E-W highway are not confined to Northern Maine and benefit the entire State.
- Non-transportation influences on US/Canada trade introduce additional "risk" to the impact forecasts. Risks that impacts will be lower than projected, exceed the risks that forecast results are underestimated.
- I-89 and I-91 may have helped Northern NH and VT over the past 3 decades, but neither highway has dramatically altered the underlying economic structure of the corridor communities.
- The limited ability of those corridors to stimulate Canadian investment from Montreal suggests that the Maine E-W highway would face similar challenges in the future.
- An east-west corridor improvement should aid regional efforts to recruit business investment and diversify the economies of Central and Northern Maine, but will not necessarily guarantee success. The experience of the I-89 and I-91 corridors indicate that incremental gains following the construction of an E-W highway would be modest.

Please see the Comparison of alternative East-West corridors graphic that is attached to the end of this report

The Study Team

The staffs of the Maine Department of Transportation and Maine State Planning Office assigned to this project were supported throughout this study effort by a number of consultants with a broad range of disciplines and expertise needed to address the complex issues associated with this project:

Maine State Planning Office

RKG Associates, Inc., - Economic research and overall project management

VanasseHangen Brustlin, Inc. - Transportation infrastructure assessment

Standard & Poors DRI - Regional and international freight movements, commodity forecasts, and Canadian market forecasts

Davidson Peterson Associates, Inc. - Tourism market research and impact assessment

Charles S. Colgan, Ph.D. - Economic forecasts and impact analysis, and US/Canadian trade issues

Maine Department of Transportation

Kevin Hooper Associates - Traffic forecasts/modeling

Wilbur Smith Associates - Toll financing feasibility analysis

Roger Mallar Associates - Study advisor

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Maine East-West Highway Economic Impact Analysis, Phase III Technical Report, Economic Impacts, RKG Associates, Inc., September, 1999.

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Comparison of Alternative East-West Corridors

	Corridor A Routes 8 / 16 / 201	Corridor B Routes 9 / 2	Corridor C Routes 9 / 27	Corridor D New Alignment	Corridor E New Alignment
Engineering					
	<ul style="list-style-type: none"> 2-lane upgrade 87 mi. - reconstruction 115 mi. - widening * 	<ul style="list-style-type: none"> 2-lane upgrade 37 mi. - reconstruction 15 mi. - widening * 3 new highway segments 	<ul style="list-style-type: none"> 2-lane upgrade 83 mi. - reconstruction 17 mi. - widening * 3 new highway segments 	<ul style="list-style-type: none"> 4-lane limited access 95+/- new bridges 1 new interchange 	<ul style="list-style-type: none"> 4-lane limited 60+/- new bridges 1 new interchange
Environment					
Potential Significant Resources of Concern	<ul style="list-style-type: none"> Wetlands in Milo, Orneville, Monson Piscataquis River - Atlantic Salmon Moosehead Lake Appalachian Trail 	<ul style="list-style-type: none"> Moosehorn National Wildlife Refuge Atlantic Salmon - in various rivers White Mountain National Forest Historic Districts - Pittsfield, Skowhegan, Rumford 	<ul style="list-style-type: none"> Moosehorn National Wildlife Refuge Bigelow Mountain - National Natural Landmark Chain of Ponds Appalachian Trail Cathedral Pines - Historic Site Atlantic Salmon - in various rivers Historic Districts - Pittsfield, Skowhegan 	<ul style="list-style-type: none"> Moosehorn National Wildlife Refuge Bigelow Mountain - National Natural Landmark Chain of Ponds Appalachian Trail Cathedral Pines - Historic Site Atlantic Salmon - in various rivers US Fish & Wildlife Refuge - Edmunds Historic Districts - Pittsfield, Skowhegan 	<ul style="list-style-type: none"> Grafton Notch State Park Historic District - Rumford Moosehorn National Wildlife Refuge Atlantic Salmon - in various rivers White Mountain National Forest US Fish & Wildlife Refuge - Edmunds
Travel					
Change in Daily Vehicle Miles of Travel - Year 2030	Autos - 545,650 Trucks - (3,640)	Autos - 572,370 Trucks - 660	Autos - 541,590 Trucks - 2,940	Autos - 1,024,960 Trucks - (95,480)	Autos - 1,272,740 Trucks - (3,420)
Change in Daily Vehicle-Hours of Travel - Year 2030	Autos - 10,360 Trucks - (20)	Autos - 12,240 Trucks - (300)	Autos - 12,470 Trucks - (380)	Autos - 140 Trucks - (2,580)	Autos - 5,120 Trucks - (1,220)
Travel Time Saving - Maine's Eastern to Western Borders	54 minutes	18 minutes	21 minutes	81 minutes	39 minutes
Economic Impact (Year 2030)					
Employment (jobs)	484	1,433	1,153	3,685	3,226
Personal Income (\$M/year)	46	130	104	328	291
Disposable Income (\$M/year)	16	66	51	196	171
Gross Regional Product (\$M/yr)	23	84	61	216	192
Population (persons)	827	2,347	1,936	6,312	5,484
Cost					
	\$151,540,000	\$164,880,000	\$207,989,000	\$1,169,550,000	\$796,000,000
Miles					
	211	212	221	227	156

* Minor widening of existing travel lanes and shoulders to achieve standard of 12-foot travel lanes and 8-foot shoulders.