Final Report

South West Nova Scotia Transportation Study

prepared for:

Atlantic Canada Opportunities Agency

prepared by:

CPCS Transcom Limited

in association with

Opus International Consultants (Canada) Limited

Catalogue number: AC5-2/2010E-PDF
ISBN: 978-1-100-16331-4
ACOA: 2010-06

South West Nova Scotia Transportation Study – PREFACE

In 2008, the federal government and the governments of Nova Scotia and New Brunswick announced the extension of the ferry service between Digby, Nova Scotia and Saint John, New Brunswick until early 2011, with an investment of $11.1 million from the federal government and $2 million each from the Provinces of Nova Scotia and New Brunswick.

At that time, the Atlantic Canada Opportunities Agency (ACOA) agreed to coordinate a broad analysis of the transportation systems and economies of the regions served by the ferry services. This analysis would be undertaken within the context of the transportation needs of the region and the overall network in place. The fundamental task was to identify the components of a transportation system in South West Nova Scotia that would support the region's industrial competitiveness and development over the long term, as well as enable economic development opportunities for the future.

ACOA agreed to undertake research on the transportation system in South West Nova Scotia, including identification of economic drivers, traffic patterns and an analysis of current and projected demand for all modes of transportation. The study would identify options for and configurations of ferry services and provide an analysis of the costs and benefits of these options, including the option of no ferry service, along with transportation services provided through other modes. The study would identify other transportation modal constraints and opportunities.

ACOA engaged CPCS Transcom Limited (CPCS) along with Opus International Consultants (Opus), to conduct an analysis of South West Nova Scotia's transportation system, including the Digby–Saint John and Yarmouth–Maine ferry services. As part of the study process, CPCS/Opus used information from the federal and provincial governments, the local communities and industry associations, and previous studies. In addition, CPCS/Opus held several public consultation sessions and met with members of the local business community.

This report is the result of many months of analysis and includes the comments received from members of the public, local businesses and industries and government departments. ACOA would like to thank those who provided their comments for their time and contributions. These comments have been beneficial in increasing understanding of the role of the Digby–Saint John and Yarmouth–Maine ferry services within the regional transportation network.

In moving forward, the study will be one of a number of inputs to a broad assessment of the regional transportation system and economy for consideration by decision-makers and users of the ferry services. This study forms an important piece of evidence that will be used to inform policy-makers and stakeholders as they consider the roles they may play in the future transportation system in South West Nova Scotia and on which they may base future decisions.

ACOA will continue to work to create opportunities for economic growth in the region through mechanisms such as Team Southwest Nova Scotia, consisting of senior federal and provincial government officials as well as community stakeholders.

Atlantic Canada Opportunities Agency
Agence de promotion économique du Canada atlantique
Canada

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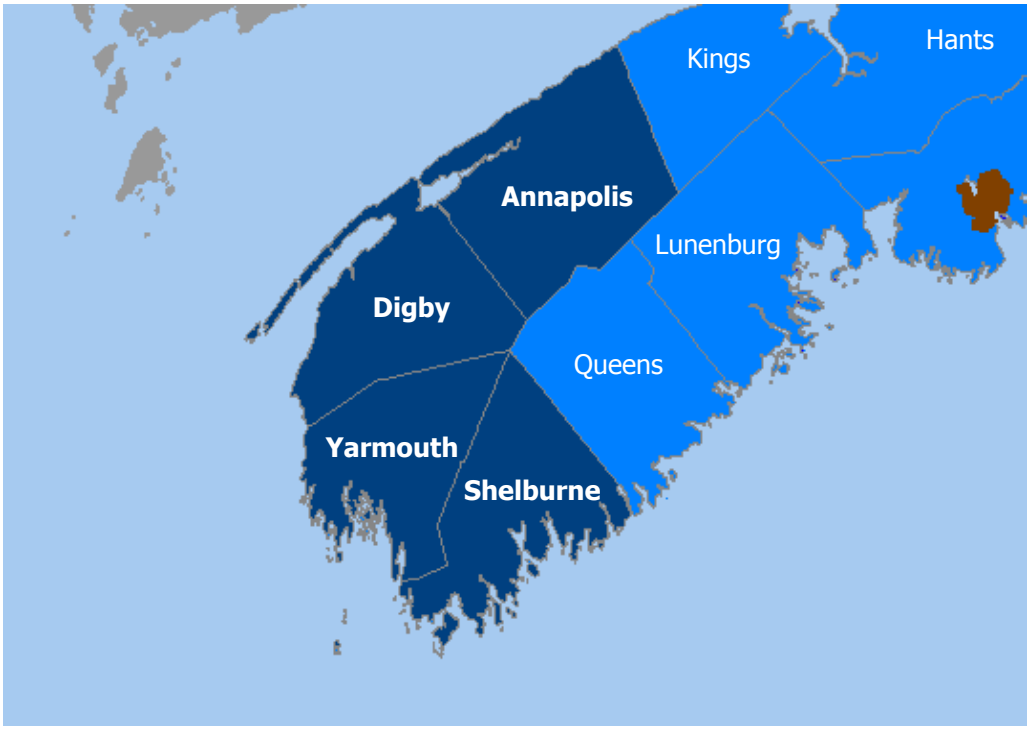
Acronyms / Abbreviations

AADT	Average Annual Daily Traffic
AADTT	Average Annual Daily Truck Traffic
ACOA	Atlantic Canada Opportunities Agency
ACTP	Atlantic Canada Tourism Partnership
ADEDA	Annapolis Digby Economic Development Agency
CBSA	Canada Border Services Agency
CPCS	CPCS Transcom Limited
CRV	Commercial Related Vehicle
CTC	Canadian Tourism Commission
DFO	(federal) Department of Fisheries and Oceans
DHPA	Digby Harbour Port Association
DMA	Digby Municipal Airport
DSWN	Destination Southwest Nova
ha	Hectares
HMVK	Hundred-Million Vehicle Km (travelled)
HSIA	Halifax (Robert) Stanfield International Airport
ILS	Instrument Landing System
LFA	Lobster Fishing Area
loa	Length Over All
LOS	Level of Service
ME	Maine
MHS	Maritime Harbours Society
NB	New Brunswick
NHS	National Highway System
NM	Nautical Mile
NS	Nova Scotia
NSTCH	Nova Scotia Department of Tourism, Culture and Heritage
NSTIR	Nova Scotia Department of Transportation and Infrastructure Renewal
PRV	Passenger Related Vehicle
ROPAX	Roll-on/roll off passenger vessel
RORO	Roll-on/Roll-off vessel
SWNS	South West Nova Scotia
SWSDA	South West Shore Development Authority
VFR	Visiting Friends and Relatives
VOR/DME	VHF omni-directional range/distance measuring equipment

Executive Summary

South West Nova Scotia (SWNS), which comprises Annapolis, Digby, Yarmouth and Shelburne counties, is located at the south western tip of the province. Transportation plays a key role in the region's economy, both in terms of exporting its products as well as bringing in tourists. The purpose of this Report is to provide an analysis of the economic drivers of SWNS and the related role of transportation; to analyze trade flows and traffic patterns; to assess the suitability of the transportation system to support current and projected traffic flows and regional economic development; to cost the options that will best support the economic development aims of the region over the long term; and provide a "menu" of transportation options for stakeholders to consider.

Figure A: South West Nova Scotia and its Counties



Source: Nova Scotia Geomatics Centre, Province of Nova Scotia.

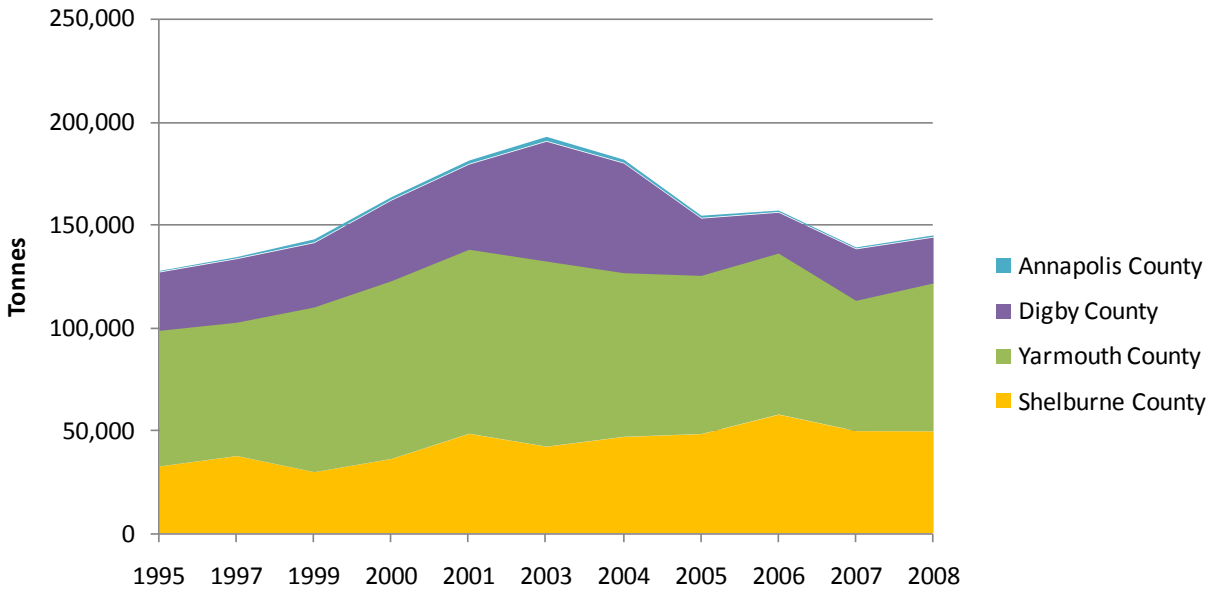
Analysis of Trade Flows and Traffic Patterns

Fishing and fish processing are the most important economic drivers in SWNS. The volume of fish harvested in SWNS peaked in 2003 and has declined since that time (Figure B). However, the price received for that reduced volume remained relatively strong. Seafood production in the region is heavily focused on exports of live and fresh groundfish and shellfish. Most fish is exported to the United States, but some is flown to markets around the world. In many cases,

fish must first be trucked to airports in Montreal, Toronto, Boston, or New York in order to be loaded on aircraft. Total Nova Scotia seafood exports trucked to the US for onward shipment by air is approximately 15,000 tonnes.

For the fishing and fish processing industries, transportation costs are secondary to the speed, quality and reliability of transportation, since product degrades quickly and easily. It is also important to note that fish catches are highly seasonal with peaks from December through January, particularly for lobster, which generates the greatest income for the region. Future growth is limited by resource stocks, but aquaculture offers some potential opportunities.

Figure B: Fish Harvested in SWNS, 1995-2008



Source: CPCS analysis of data from the Department of Fisheries and Oceans

A combination of industry consolidation and higher transportation costs is seriously undermining the viability of the forest products industry in SWNS. At the same time, the increasing importance of electronic media is reducing the demand for newsprint, leaving producers fighting for a share of a shrinking market. The largest flows of forest products are the shipments of logs and wood chips to Bowater Mersey, the Brooklyn Power Corporation, and the Oakhill Sawmill; all three establishments are located outside the study area, in Queens County. When Bowater Mersey is operating at full capacity, it produces approximately 500,000 tonnes of product per year. Material drawn from SWNS is primary sourced from Yarmouth County, with Digby and Annapolis counties also supplying fibre, while Shelburne County is not an important source of this flow. Until two or three years ago, the Irving Group moved a significant volume of wood chips and pulp wood across the Bay of Fundy by ferry from Nova Scotia to New Brunswick. However, this product is now sourced closer to plants in New Brunswick.

While a rebound in the US housing market could provide an opportunity for wood product manufacturers and loggers, given that the four largest sawmills in SWNS have all closed since 2000, it seems unlikely that the forest products sector will be a large driver of transportation demand in SWNS in the long-run.

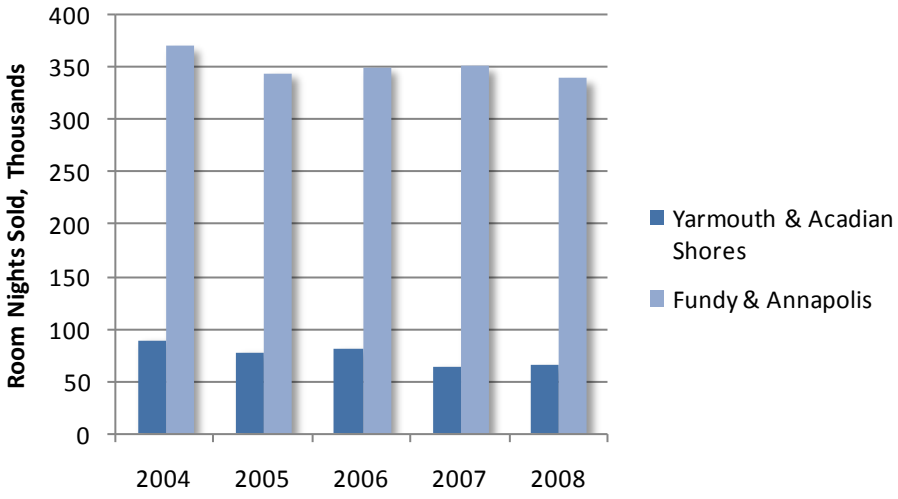
Agriculture is also a source of demand for transportation services. Agricultural commodities like mink pelts, fruit, and pork can be sold in markets outside SWNS. Mink farming is a particularly important type of farming in SWNS. Since mink consume animal products, mink farms require fish, chicken, and other animal waste products as a key input to production. These products are sourced locally and from as far away as the US eastern seaboard and Ontario. For instance, much fish waste from plants in SWNS is processed at Nova Feeds Ltd. in Meteghan, Digby County. Chicken and fish waste are a useful back-haul cargo for trucks that transport seafood and fish products to the United States and central Canada.

There is general agricultural traffic throughout the region, but much less so in Shelburne County, associated with bringing fertilizer and other inputs to farms and with taking farm products to market. No data are available on such movements, but they occur by truck.

Tourism in SWNS has been declining in recent years. It has been adversely affected by the strength of the Canadian dollar against the US dollar, the requirement that American tourists obtain a passport to re-enter the United States, security issues, rising gas prices, changing consumer preferences and stronger competition from other tourism destinations and the cruise industry. It is also important to note that, like fishing, tourism is highly seasonal, peaking in the summer and early autumn.

One of the fundamental ways to measure tourism activity is through room sales. The following figure shows the trend since 2004:

Figure C: Accommodation Demand, Rooms Sold by Region, 2004-2008



Source: CPCS analysis of data from Nova Scotia Tourism and Culture, Research and Statistics

General Traffic is also generated by the need to provide the goods and services to the residents of SWNS. This type of traffic includes work and non-work trips by residents and regular commercial shipments of products such as construction materials, groceries, and hardware. This traffic will vary with population and to some extent with income. All else being equal, the traffic between larger centres will be larger than the traffic between smaller centres, hence the term

"gravity" traffic. This traffic is influenced by the trend toward the creation of Yarmouth as a regional service centre.

The following figure summarizes the industry forecast.

Figure D: Summary Forecast by Industry Sector

Industry	Outlook 2010-2019
Fishery and Fish Processing	The most likely scenario is for a return to the average harvest levels of the 10 years from 1997 to 2008 by 2011 with no further growth in the volume of fish products produced in SWNS. The optimistic scenario is that production of traditionally caught fish increase to the average 1997-2008 level by 2011, then increase slowly by 1.0 percent per year (not compounded). The pessimistic scenario assumes that the traditional fishery does not recover, but rather peaks in 2008, then declines by 0.5 percent per year (not compounded).
Agriculture	At the level of detail that is relevant for this study, agricultural traffic should be expected to stay roughly constant over the next ten years.
Tourism	Overall, in a high growth scenario we expect that tourism to SWNS will recover somewhat over the next 10 years as Americans get used to new border security and passport requirements and if the Canadian dollar does not appreciate too rapidly against the US dollar. As well, tourism could recover with the economy and with strong advertising and some investments by tourism operators. On balance it seems likely that tourism will stabilize in SWNS, and perhaps recover slightly. At worst, a continued rise in the Canada-US dollar exchange rate, higher gasoline prices, and renewed border security concerns could continue to drive down tourism, although it is hard to imagine rates of decline observed in recent years would be repeated.
Forestry	While a rebound in the US housing market could provide an opportunity for wood product manufacturers and loggers, given that the four largest sawmills in SWNS have all closed since 2000, the opportunity for SWNS to take advantage of this opportunity is questionable. Overall, it seems unlikely that forestry will drive an increase in traffic volumes in the long run. It is likely there will be some rebound in traffic as the economy in general, and the US housing market in particular, recovers in 2010 and 2011. However, this recovery will be offset by the fact that much of the capacity to produce wood products in SWNS has been closed permanently over the past 10 years.
Mining	Mining is unlikely to generate significant traffic in the next ten years.
Manufacturing	There are currently no plans to significantly expand manufacturing in SWNS. At the level of detail that is important for this study, traffic should be expected to stay roughly constant over the next 10 years.
Population Gravity Traffic	The most likely case is that population gravity traffic will exhibit a mild decline over the next 10 years. Traffic patterns will change in line with the continued development of regional service centres.

The study was expected to consider economic development opportunities in SWNS that could affect transportation demand. Stakeholder consultations which took place mid-way through the study solicited input from RDAs, business people and local residents. Many ideas were presented and synthesized, but they were not subjected to further analysis because the consultants were instructed to focus more of their efforts on the ferry configuration options and analysis. None of the ideas presented were considered "game changers" in terms of affecting

transportation demand but some may be worthy of further study by economic development practitioners.

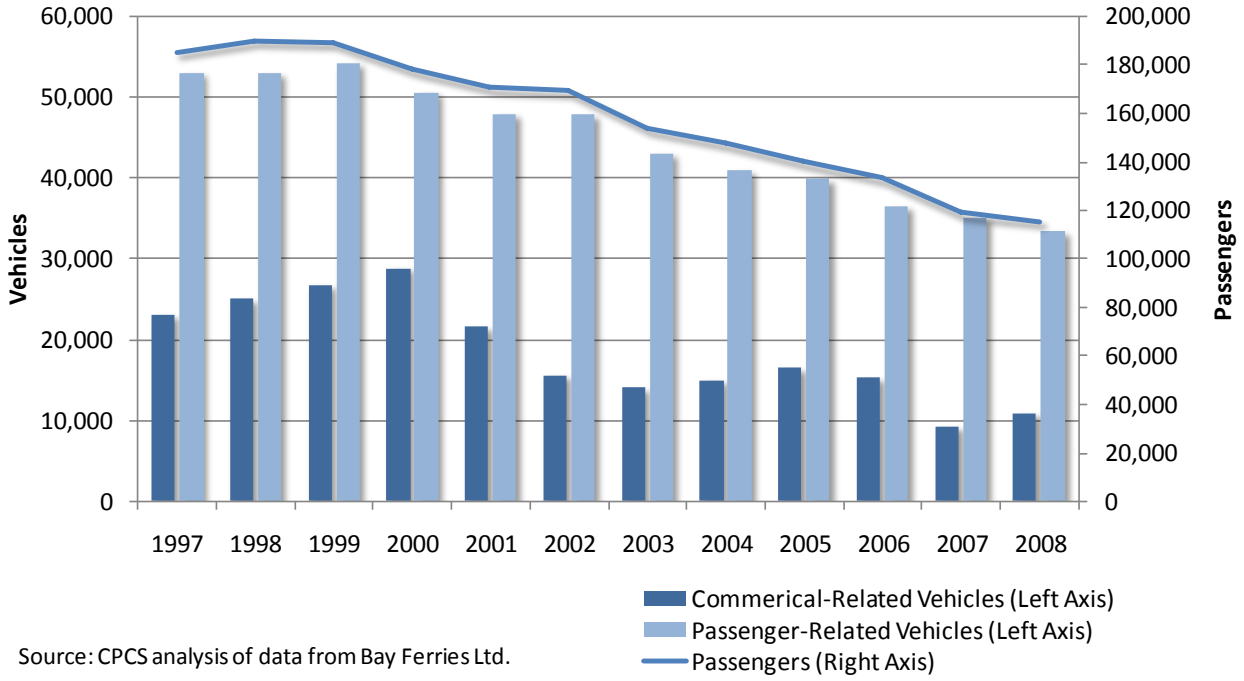
The Regional Transportation System

Ferries

As of the commencement of this study in August 2009, ferries connected Digby with Saint John, NB and Yarmouth with Bar Harbor, ME and Portland, ME.

Since Bay Ferries took over the Digby-Saint John service in 1997, passenger traffic peaked in 1998 at 190,246.[1] Passenger related vehicles (PRVs) peaked in 1999 at 54,337 (the historical peak for PRVs was in 1989 at 66,547). Commercial-related vehicles (CRVs) peaked in 2000, at 28,945 units, which was also the historical peak. Since 1998, passenger traffic has declined about 39 percent, while commercial traffic has dropped about 57 percent since 2000.

Figure E: Traffic, Digby-Saint John Ferry, 1997-2008

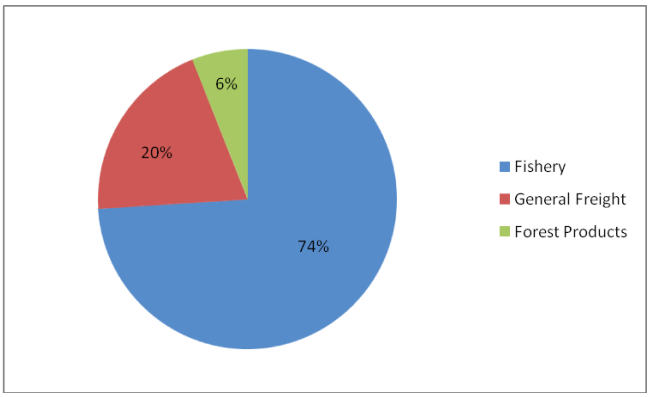


Source: CPCS analysis of data from Bay Ferries Ltd.

As of the 2008-09 period, the vast majority of commercial traffic on the Digby-Saint John service is fishery-related, followed by general freight and forest products, as illustrated in the chart below.

[1] The absolute peak in passenger traffic was recorded in 1983 at 241,613 passengers.

Figure F: Digby-Saint John Commercial Traffic, October 2008-Septmber 2009



Source: Bay Ferries

A major and imminent issue with the Digby-Saint John service is the age and condition of the *Princess of Acadia*, which at 39 years old, is nearing the end of its lifecycle. Recent technical assessments indicate that the ship will require major repairs and significant expenditures to remain in safe operating condition and maintain the current level of service.

Of the three forecast scenarios examined, in the probable forecast scenario, passenger and related traffic will rebound by 4.0 percent in 2010, followed by a subsequent annual growth of 1.0 percent. The initial recovery is anticipated as a result of marketing initiatives and schedule refinements proposed by the operator in an effort to recapture a portion of the passenger market lost in recent years. Long term growth is estimated at a modest 1.0 percent given that general levels of economic activity in the study area are not expected to rebound significantly over the medium term. This traffic forecast is set within the context of economic growth projections for Nova Scotia of 2.2 percent and 1.9 percent in 2010 and 2011 respectively.[2]

In the intermediate and high scenarios, commercial related traffic will see double-digit percent increases over the next three years, based primarily on the following three factors:

- Fish harvest volumes will return to 10-year industry averages;
- The volume of forestry-related movements will rebound slightly to approximately one-third of historical peak levels, and
- Planned upgrades to the NB Southern Railway will provide an enhanced intermodal rail alternative for shippers, resulting in a stimulus in drop trailer traffic for the ferry service.

While the projected growth in the high and intermediate scenarios is greater than the depressed levels experienced in 2009, it should be noted that commercial traffic levels projected for 2012 will still be below levels experienced in the 2002-2006 period.

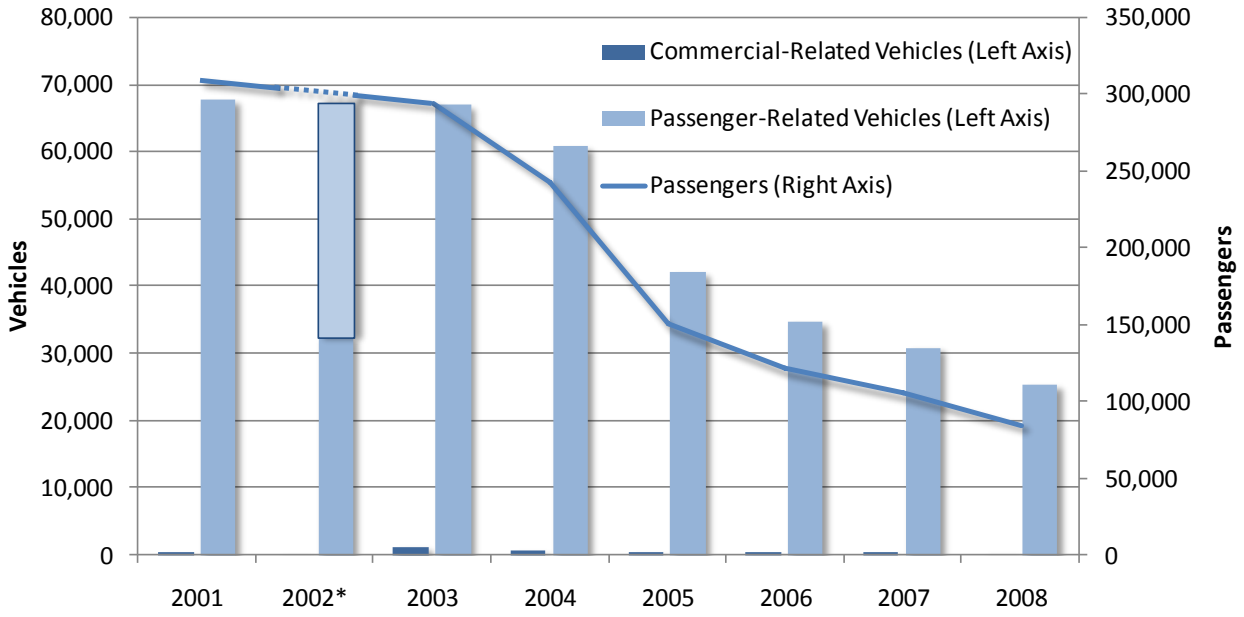
[2] Conference Board of Canada, "Provincial Outlook", Spring 2010.

Beyond 2013, growth will be limited to the general freight traffic component, resulting in annual increases of 1.0 percent.

In the probable scenario, both passengers and related vehicles will grow by 3.0 percent in 2010, 2.0 percent in 2011, and 1.0 percent in subsequent years. Growth will be attributable primarily to new travel promotions and package deals that are currently being marketed by the operator. It should be noted that the impacts of these efforts were being experienced in the fall of 2009, but that September visitation was still down by 3 percent over the previous year. Demand may be further stimulated as the uncertainties and confusion surrounding the recently implemented passport and security requirements become resolved. Whether these two factors are sufficient to overcome long term declines in regional tourism remains to be seen. The issue of the dollar exchange rates, high fuel prices and other competitive factors still remain.

Like the Digby ferry, the Yarmouth-Maine services have experienced reductions in traffic in recent years. Over the past eight years, passenger traffic on the Yarmouth–Maine route has fallen from a peak of over 300,000 to less than 85,000, a decline of over 70 percent, as illustrated in the figure below.

Figure G: Traffic, All Yarmouth-Maine Ferries, 2001-2008



Source: CPCS analysis of data from Bay Ferries Ltd. and Scotia Prince Cruises
Note: *Bay Ferries *Cat* only, *Prince of Fundy* data not available. Dotted line and outlined column reflect estimated value based on linear interpolation.

Road Network

The road network in SWNS consists of provincial arterial, trunk, and collector highways, as well as local roads. Highway 101 and Highway 103 are the most critical components of the highway

network in SWNS, carrying the highest volumes of traffic and ultimately connecting the region with the rest of North America.

Overall, the road network in SWNS meets the transportation needs of the region. There are no major road network expansion projects funded for the short term. However, a handful of issues were identified by stakeholders including a lack of controlled access on Highway 101 between Digby and Weymouth; uncontrolled segments of Highway 103; lack of a high speed interconnection between Highway 101 and 103 in Yarmouth; access to Digby from Highway 101; and, truck access to Yarmouth Harbour. In addition, increased maintenance costs associated with aging infrastructure were identified as a future concern for the Nova Scotia Department of Transportation and Infrastructure Renewal. Truck traffic accounts for a considerable portion of the volumes on the highways of SWNS.

Figure G presents the Average Annual Daily Truck Traffic (AADTT) on main routes in the region, as estimated using vehicle classification counts conducted by Nova Scotia Transportation and Infrastructure Renewal (NSTIR). As shown, truck volumes on the 100-series highways range from approximately 180 to 400 trucks per day.

Figure H: Study Area Truck Volumes

Route	AADTT
Highway 101	180 - 400
Highway 103	200 - 300
Highway 303	50
Trunk 8	120
Trunk 10	50-80

Source: Opus analysis of data from NSTIR

Traffic in the region is expected to grow at 0 to 1.0 percent over the next 10 years. For the purposes of this study, annual growth of 1.0 percent was selected to evaluate existing infrastructure capacity in the study area. By comparing existing volumes to the available capacity on each road, it is evident that the existing highway network has more than adequate capacity to handle both current and future traffic demand.

Ports

The principal harbours in SWNS are located in Digby, Yarmouth and Shelburne. It is important to note that the Digby wharf, as opposed to the ferry dock outside town, does not really serve a transportation function, as it is mainly used by local fishers and boaters and does not handle cargo. However, much of the fish and seafood caught and processed is shipped across on the Digby-Saint John ferry. The harbour's wharf structure, primarily used by local fishers, requires rehabilitation, and financing these improvements is an issue.

In Yarmouth, apart from dredging which may soon be required, port infrastructure, with the exception of the ferry terminal, is in good condition, although landside port access is seen as an issue. Yarmouth has ambitious expansion plans, but the business case has not yet been proven.

Shelburne completed a Business Plan in 2006 and is looking at an expansion of the wharf to reduce crowding of fishing vessels. At that time, much of the business case was predicated on

expanded container handling and bulk shipments by Black Bull Resources, which has not yet materialized.

Airports

Both Yarmouth and Digby have airports. Neither airport has scheduled passenger service, nor do they see significant air cargo traffic. The facility at Yarmouth International Airport is adequate for current and future passenger air travel needs. While there is air cargo generated in the region by the fishery, there is little demand for inbound air cargo capacity. As a result, the economics of air cargo service to Yarmouth are weakened. Improvements in the highway network reduce the demand for air travel to Halifax, and make Halifax more attractive for air cargo shipments, although even in Halifax outbound air cargo capacity is limited by a small market for inbound shipments.

Ferry Configuration Options and Analysis

As a first step, the study team developed a list of performance evaluation criteria to guide the assessment of potential ferry service options. These criteria, which considered SWNS transportation needs and operating/financial criteria, included:

- Fishing Industry Time Sensitivity;
- Tourism Impacts;
- Reliability;
- Frequency;
- Passenger Comfort;
- Network and Economic Productivity Benefits;
- Environmental Considerations; and
- Commercial Viability.

A preliminary listing of ferry service options was subsequently structured around the terms of reference requirement to examine the following ferry service configurations:

- Option 1: Ferry services at Digby and Yarmouth;
- Option 2: Ferry service at Yarmouth only;
- Option 3: Ferry service at Digby only;
- Option 4: Alternating ferry service at Digby and Yarmouth; and
- Option 5: Short sea shipping from Yarmouth to the US.

A total of 16 alternatives (see Figure G) were identified in the preliminary listing, which were then evaluated against the criteria mentioned above. A number of observations resulted from the evaluation of the preliminary options:

- None of the Bay of Fundy ferry service options examined are commercially viable with, or without, the vessel capital included. As a consequence, service continuation would require capital support and operating support;

- Yarmouth-only, or Digby-only, ferry service options contain negative consequences for the excluded port;

- Cancellation of the Yarmouth high speed service in 2010 effectively entails a Digby only ferry service, at least for 2010, and as such contains negative consequences to Yarmouth; and

- Having no ferry service at either Digby or Yarmouth would have a negative impact on three key industries including the fishery, agriculture and tourism.

Figure I: Preliminary Ferry Service Configuration Options

Option	Digby-Saint John	Yarmouth-Maine	Yarmouth-Gloucester
1 (a)	Ropax provided by the *Princess of Acadia* until 2011 with replacement by a 1 year charter followed by a $50-million used ropax.	Seasonal high speed service to Bar Harbor and Portland.	No service.
1 (b)		Seasonal Cat service to Bar Harbor.	
1 (c)		Seasonal ropax to Bar Harbor, using a $50-million used vessel.	
1 (d)		Seasonal used cruise ferry to Portland, using a $50-million used vessel capable of handling limited commercial traffic.	
1 (e)	Ropax provided by the *Princess of Acadia* until 2011 with replacement by a 2 year charter followed by a new $100-million vessel.	Seasonal high speed service to Bar Harbor and Portland.	
1 (f)		Seasonal high speed service to Bar Harbor.	
1 (g)		Seasonal ropax to Bar Harbor, using a $50-million used vessel.	
1 (h)		Seasonal used cruise ferry to Portland, using a $50-million used vessel capable of handling limited commercial traffic.	
2 (a)	No service.	Year-round ropax service to Bar Harbor, using a $50-million used vessel.	No service.
2 (b)		Seasonal high speed service to Bar Harbor only.	No service
2 (c)		Seasonal ropax to Bar Harbor, using a $50-million used vessel.	Year-round service using a $10 million used roro vessel.
2 (d)		Seasonal used cruise ferry to Portland, using a $50-milliion used vessel capable of handling limited commercial traffic.	Year-round service using a $10 million used roro vessel.
3 (a)	Ropax provided by the *Princess of Acadia* until 2011 with replacement by a 2 year charter followed by a new $100-million vessel.	No service.	No service.
3 (b)	Ropax provided by the *Princess*		

	of Acadia until 2011 with replacement by a 1 year charter followed by a $50-million used ropax.		
4	Winter ropax service (same vessel used for Yarmouth in the summer)	Summer ropax service from Yarmouth to Bar Harbor (same vessel used for Digby in the winter).	No service.
5	No service.	No service.	Year-round service using a $10 million used roro vessel.

Based on the evaluation of the preliminary options, a total of seven (7) options were shortlisted for undertaking a more detailed assessment:

Opt 1(a): Used Ropax (Dig-SJ) + High Speed Ferry (Yar-BH & Port)

Opt 1(b): Used Ropax (Dig-SJ) + High Speed Ferry (Yar-BH only)

Opt 1(d): Used Ropax (Dig-SJ) + Seasonal Cruise Ferry (Yar-Port)

Opt 1(f): New Ropax (Dig-SJ) + High Speed Ferry (Yar-BH only)

Opt 1(h): New Ropax (Dig-SJ) + Seasonal Cruise Ferry (Yar-Port)

Opt 3(a): Used Ropax (Dig-SJ) + No Yarmouth Service

Opt 3(b): New Ropax (Dig-SJ) + No Yarmouth Service

The net economic impacts of having no service in both Digby and Yarmouth were estimated to be -$211.3 million (Present Value in $2010) by eliminating the impacts provided by Option 1(a) – which effectively represents the existing configuration at the commencement of this study. An overall operating deficit of $144.0 million would arise in the course of achieving the net economic impacts of the status quo.

In other words, over ten years SWNS would lose $141 million in benefits from three principal categories: commercial trucking ($54.5 million), the tourism industry ($38.2 million) and reduced passenger vehicle operating costs ($30.7 million). For the same analysis applied to what was the status quo at the beginning of the project, i.e. Yarmouth-Maine high speed service in place, over ten years SWNS would lose $70.4 million in benefits, consisting primarily of travel/time impacts ($22.2 million) and benefits to Nova Scotia tourism ($35.1 million). Operating deficits of $91 million would be avoided in the case of Digby-Saint John and $53 million in the case of Yarmouth-Maine.

Without a ferry service between Digby and Saint John, commercial truck traffic would need to drive an average of an extra 570 km. Over 75 percent of all traffic on this ferry was fishery-related in 2008-09; without ferry service there is concern that product degradation will result in lower prices, and that mortality rates for live lobster shipments will increase. An estimated 20

percent of tourists travel to SWNS would not occur without this ferry service. With additional traffic on regional highways, additional accidents will occur in line with the current accident profile in the study area. The region would lose the wages currently paid to ferry service workers, both at the terminals and onboard the vessel. Other expenditures on goods and services would also disappear, as would the need to maintain a visitor information centre.

For the Yarmouth-based service, the region would experience the loss of motorcoach traffic that has been carried on the *Cat*. There would also be a reduction in the number of tourists not passing through or making a specific visit to the Yarmouth area. Travellers from the US using their automobiles would face a long drive around via Amherst or a more expensive air alternative. Additional highway travel will result in more wear and tear on local highways as well as more accidents. The region would lose ferry service employment and other ferry service expenditures. It is unlikely that a visitor information centre would be required in Yarmouth, nor Canada Border Security Agency services.

The only positive impacts could come from meals and fuel purchased by tourists and truck drivers travelling from SWNS around via Amherst and New Brunswick. However, if fuel is less costly in the US or New Brunswick, these purchases would likely be made in those areas rather than in SWNS or indeed, Nova Scotia.

Figure J below presents a summary of estimated impacts for each of the shortlisted options.

Figure J: Summary of Estimated Impacts over 10 year period for Shortlisted Options

Option	Net Costs (PV - $2010 millions)	Net Benefits (PV - $2010 millions)	Benefit/Cost Ratio
Opt 1(a) – Dig-SJ Ropax (used)	$91.0	$141	1.5
Opt 1(a) – Yar-Me High Speed	$53.0	$70	1.3
Opt 1(b) – Dig-SJ Ropax (used)	$91.0	$144	1.6
Opt 1(b) – Yar-BH High Speed	$70.2	$45 to $70	0.6 to 1.0
Opt 1(d) – Dig-SJ Ropax (used)	$91.0	$135 to $140	1.5
Opt 1(d) – Yar-Port Cruise	$30.6	$20 to $25	0.7 to 0.8
Opt 1(f) – Dig-SJ Ropax (new)	$116.7	$150 to $160	1.3 to 1.4
Opt 1(f) – Yar-BH High Speed	$70.2	$45 to $70	0.6 to 1.0
Opt 1(h) – Dig-SJ Ropax (new)	$116.7	$150 to $160	1.3 to 1.4
Opt 1(h) – Yar-Port Cruise	$30.6	$20 to $25	0.7 to 0.8
Opt 3(a) – Dig-SJ Ropax (used)	$88.3	$155 to $165	1.8 to 1.9
Opt 3(a) – No Service Yar	-	-	-
Opt 3(b) – Dig-SJ Ropax (new)	$112.0	$160 to $170	1.4 to 1.5
Opt 3(b) – No Service Yar	-	-	-

Federal Policy

As was discussed in the 2006 study by Belleclaire *et. al.*, there have been a number of policy initiatives that have affected the marine industry in Canada over the past 10-15 years. The National Marine Policy of 1995 stated with respect to ferry services:

> Under the National Marine Policy, the Government of Canada will continue to support all constitutionally mandated services, as well as those required by remote communities. In order to maintain essential services, it will be necessary to ensure that limited resources are applied where needed most. The government will explore means to reduce the cost of other federally subsidized ferry services currently provided by private-sector operators.[3]

The initiative to commercialize the ferry services across the Bay of Fundy, including Digby-Saint John and Yarmouth-Bar Harbor, was a direct result of the National Marine Policy. A world-wide RFP was issued in the summer of 1996, which stipulated that the services were to be operated free of subsidy after five years.

The 2006 Belleclaire study also examined the issue of government funding for ferry services in Canada. The only constitutionally-mandated ferry service links Port aux Basques, NL with North Sydney, NS. Other federally supported services include the following.

Fig K: Federal Funding of Ferry Services

Province	Service	Constitutional / Remote
NL-NS	North Sydney – Port aux Basques	Constitutional
NL-NS	North Sydney - Argentia	No
PEI-NS	Wood Islands-Caribou	No
NS-NB	Digby-Saint John	No
QC-PEI	Cap aux Meules-Souris	Remote
BC	Various	Some remote

Source: Belleclaire et.al., "Digby-Saint John Ferry Service: Issues and Options", 2006.

Most provincial governments also contribute to the provision of ferry services in Canada, the only exception being PEI. Certain ferry services operating in BC and Quebec receive a federal contribution to assist in the provision of service to remote regions. In the 2008-2009 fiscal year, BC received $26.3 million.

Conclusion

Most transportation infrastructure in SWNS is currently well under capacity, but certain local issues do exist, and are identified in this Report. As the consulting team heard in both the sector meetings and public consultations, there are concerns about the age of the *Princess of Acadia* and its eventual replacement, but the *uncertainty* over the future of ferry services in the region is the paramount concern.

[3] "National Marine Policy
", Government of Canada, 1995.

During the consultation process, residents and businesses alike indicated the loss of ferry service would leave the region isolated and would be a major blow to those stakeholders who are leading efforts to attract investment and new residents to locate there. On the other hand, many stakeholders feel that a long term commitment to maintaining ferry service would have a tremendously positive effect on the region.

Ferry service, particularly Digby-Saint John, is considered by stakeholders and users to be an integral part of the region's infrastructure. It is critical to the $600-million commercial fishery, which is increasingly a "fresh fishery" and requires quick and reliable transportation to reach early morning markets in Boston. Of all sectors in the SWNS economy, seafood has the most extensive backward linkages into the regional economy (i.e. boatbuilding, fishing gear, fuel sales, trucking, provisioning, etc). It is also increasingly interlinked with the (estimated) $100-million mink industry, which provides backhaul cargo to seafood shippers (via the ferry service).

Even though traffic levels have declined in recent years, several key industries, including the fishery, agriculture and tourism, are dependent upon the Digby ferry service to move products to market and bring visitors to the region. In the case of the fishery, depending on the commodity carried and the time of year, it is not uncommon to have 8-10 truckloads of fresh seafood onboard the *Princess of Acadia*, representing upwards of $2 million worth of product on one sailing.

The ferry system of SWNS is an important link to markets in the US and Central Canada, and allows tourists to access the region without having to double-back. Without the ferry system (both Yarmouth and Digby) the region would be more isolated.

Issues affecting the US tourism market (including 9/11, the passport issue, dollar exchange rates, and high fuel prices, and cruise industry growth), combined with a reduction in capacity on the Yarmouth-Maine services, have resulted in a decline in the total number of passengers using the ferry services in SWNS.

While the road network in SWNS is below capacity, there are some improvements which could be considered beneficial. Two roads in particular are 1) Highway 101 between Digby and Weymouth, which is the last remaining section of Trunk 1 with uncontrolled access; and 2) Highway 103 between Sable River and Summerville Centre, which was described as the "single point of failure" on that route, where a serious accident would force motorists to drive all the way back and around via Highway 101.

Yarmouth Airport has had its challenges in recent years. With $2 million in assistance from the Province of Nova Scotia, Starlink Airlines had been providing air service to Halifax and Portland since February 2009. This service ended on December 1, 2009, but a replacement was announced in March 2010. The Yarmouth Airport Authority has indicated that it will concentrate its efforts on passenger service, attracting an air cargo carrier and a flight school to its facility. The airport in Digby is looking to high end fly-in tourists and linking up with the Digby Pines Resort to appeal to a similar type of tourist as is attracted to Fox Harb'r resort in Wallace and Crowne Jewel Resort Ranch in Cape Breton.

The "menu" of options for consideration, with estimates of expenses presented on an undiscounted accrual basis (i.e. not adjusted for inflation), includes those in Figure L below:

Figure L: Shortlist of Transportation Options for SWNS and Associated Costs

Transportation Option	Benefit-Cost Ratio	Net Economic Impact ($M)
Ferry Options		
1(a): Digby-Saint John Used Ropax	1.5	$141
1(a): Yarmouth-Maine High Speed	1.3	$70
1(b): Digby-Saint John Used Ropax	1.6	$144
1(b): Yarmouth-Bar Harbor High Speed	0.6-1.0	$45-70
1(d): Digby-Saint John Used Ropax	1.5	$135-140
1(d): Yarmouth-Portland Cruise Ferry	0.7-0.8	$45-$70
1(f): Digby-Saint John New Ropax	1.3	$150 -$160
1(f): Yarmouth – Bar Harbor High Speed	0.6-1.0	$45-70
1(h): Digby-Saint John New Ropax	1.3	$150 -$160
1(h): Yarmouth-Port Cruise Ferry	0.7-0.8	$45-$70
3(a): Digby-Saint John Used Ropax	1.8	$155-$165

3(b): Digby-Saint John New Ropax	1.4-1.5	$160-170
Road Options		
Digby-Weymouth Bypass (Highway 101)	0.10	
Port Mouton / Port Joli Bypass (Highway 103)	0.17	
Highway 101 – Highway 103 Connector	0.05	
Port Options		
Shelburne	0.1-0.4	

Note: Figures may not add up due to rounding.

The ferry configuration options with the highest benefit-cost ratio are those related to the Digby-Saint John crossing, using a used ropax, followed by a new ropax option. Of the Yarmouth options, the highest benefit-cost ratio is provided by what was the status quo until December 2009, followed by a return to operating just Yarmouth-Bar Harbor and a Yarmouth-Portland cruise ferry option.

Of the road projects, the highest benefit-cost ratio would come from the Port Mouton/Port Joli bypass, followed by the Digby/Weymouth bypass.

Of the harbour projects, the only one that qualifies as a port *per se* relates to the Shelburne port improvement project**.**

1 Introduction

1.1 Background

Like many parts of rural Canada, South West Nova Scotia (SWNS) has been hit by economic dislocation in the past 15-20 years. As a result, SWNS is struggling to retain population and grow its economy.

Given its location at the southern tip of Nova Scotia, transportation plays a key role in the region's economy, both in terms of exporting its products as well as bringing in tourists. Principal modes of transportation are the area's highways and cross-Bay of Fundy ferry services.

With the aim of ensuring adequate transportation infrastructure and services to support economic growth in SWNS, this study was undertaken to assess the region's economic drivers and the related role of transportation. The study will yield a "menu" of options to develop the transportation system in SWNS, in line with regional economic needs.

CPCS Transcom Limited (CPCS), in association with Opus International Consultants (Canada) was retained by ACOA to undertake this assignment.[4]

1.2 Objectives

The objective of the study is to complete an analysis of the transportation systems and economy of SWNS, in order to assess transportation options and economic development strategies that will best serve the regional economy while providing the most value to stakeholders. The study provides options and configurations for ferry services, and other transportation modes, as well as the costs and benefits of the various options.

1.3 Project Structure

The project was developed in three broad steps, as follows:

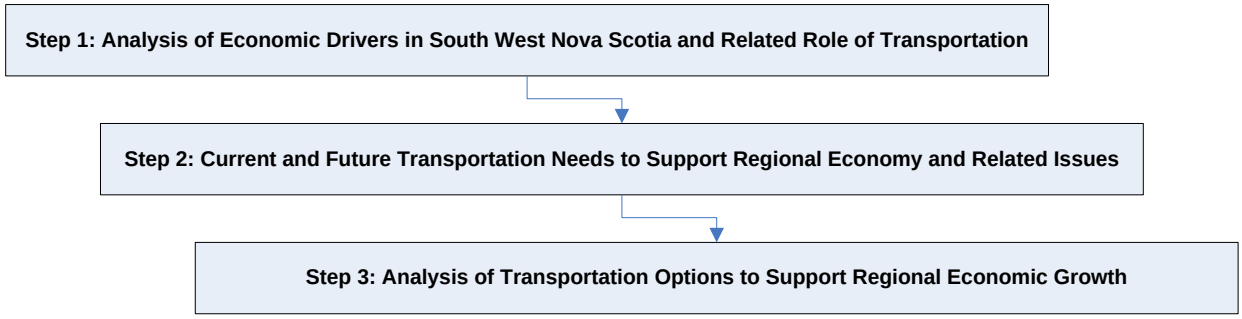
Step 1 provides an overview of the economy in SWNS, and an analysis of key drivers of economic activity. This step also addresses key economic issues affecting regional economic development. Lastly, Step 1 provides an overview of the role of transportation in supporting regional economic activity and industry, and related constraints.

Step 2 provides detailed analysis of the transportation system in SWNS and the adequacy of this transportation network to support regional economic activity. Specifically, it assesses the

[4] The reader should note that the study commenced in late August 2009 and was completed in May 2010. During the interval between the study commencement and completion, several announcements were made with respect to ferry and air service in South West Nova Scotia.

ability of existing infrastructure and transportation operations to support current and forecasted traffic flows, and assesses any and all issues affecting the efficient, cost effective flow of cargo and people.

Figure 1-1: Project Steps



Drawing on the analysis in Steps 1 and 2, Step 3 puts forth transportation options to best support regional economic and industrial development in SWNS. This step evaluates, with broad stakeholder input, a range of transportation options, with the aim of identifying and costing the options that will best support the economic development aims of the region over the long term.

1.4 Methodology

1.4.1 Regional Economic Drivers and the Related Role of Transportation

In order to identify key drivers of the economy in SWNS and their relationship to transportation a consecutive three pronged approach was used.

The consultants first reviewed all publicly available economic data related to SWNS. Data sources used include the Census of Population, Census of Agriculture, and data bases prepared by a number of government departments including Nova Scotia Finance, Nova Scotia Natural Resources, Nova Scotia Fisheries and Aquaculture, Nova Scotia Agriculture, Nova Scotia Department of Tourism, Culture and Heritage, Natural Resources Canada, Fisheries and Oceans Canada, Industry Canada, and Statistics Canada.

Next, previous research was reviewed to identify additional data sources and issues.

Finally, with key data gaps identified, selected key informants among the regional economic development agencies, transportation providers and shippers were contacted to clarify key points.

In conducting this study, the consulting team has encountered several limitations to the data that were available. Chief amongst these, are any recent data regarding the motivations for ferry travel.[5] Another gap in the literature is any indication as to what ferry passengers do after

[5] The last such study was undertaken in 1992 by Marine Atlantic. The Fundy Travel Market Demand Study examined why travellers used the Bay of Fundy ferry services and, more importantly, why they *did*

they disembark the ferry, how much they spend and where they travel after leaving Yarmouth or Digby (or, indeed, before they embark the ferry at those ports).

In addition, the study team and Tourism industry stakeholders and officials grappled with reconciling official visitor entry data with ferry ridership data supplied by Bay Ferries. We have elected to provide both sets of data, as well as a trendline which illustrates the difference in numbers but similarity in trendlines.

1.4.2 Current and Forecast Traffic and the State of Infrastructure that will Support these Flows

In order to describe major trade flows and traffic patterns in SWNS, this study reviewed available regional traffic flows and forecast data, including:

- Regional ferry traffic statistics
- Statistics Canada marine traffic and trade data bases
- Regional traffic count information (obtained from the Government of Nova Scotia)
- National Commodity Flow, Trade and Traffic Forecast data, as appropriate
- Data from regional economic development agencies
- Market and economic data for Nova Scotia

This analysis is supplemented with input from key stakeholders identified and consulted in Step 1 of this study (e.g. major regional industrial players) as well as others, including, but not limited to:

- Bay Ferries
- Yarmouth Airport Authority
- NS Department of Transportation and Infrastructure Renewal
- Municipalities in the study area
- Ports of Yarmouth, Shelburne, and Digby

1.4.3 Transportation User Constraints and Needs within the Study Area

Transportation user constraints were assessed through a series of public and stakeholder consultations held in SWNS during the period November 9-18 inclusive. Public consultations took place in Digby, Church Point, Yarmouth, Middleton and Shelburne. Thirteen sector meetings took place in Cornwallis, Digby, Yarmouth, Barrington and Saint John.

1.5 Organization of this Report

The remainder of this Report is organized as follows:

- Chapter 2: Regional Economic Drivers and the Role of Transportation
- Chapter 3: Analysis of Trade Flows and Traffic Patterns
- Chapter 4: Regional Transportation System

not use those services. The information gleaned from this study changed the company's approach to marketing the services. Almost 20 years later, we can only guess at the motivations for using or not using these ferries.

- Chapter 5: Ferry Configuration Options
- Chapter 6: Road Improvement Options
- Chapter 7: Port Improvement Options
- Chapter 8: Summary of Transportation Improvement Options
- Chapter 9: Federal Policy
- Chapter 10: Conclusion

2 Regional Economic Drivers and the Role of Transportation

This chapter analyses regional economic drivers and the role of transportation in SWNS. The first section provides a socio-economic overview of SWNS. The second section describes the area's key industries.

2.1 Overview of the Region

This section of the report provides an overview of SWNS in terms of

- Geography and history;
- Population and demographics;
- Labour force;
- Income; and
- Fuel prices.

2.1.1 Geography and History

The SWNS region, for purposes of this study, is comprised of four counties: Annapolis, Digby, Yarmouth, and Shelburne (Figure 2-1).

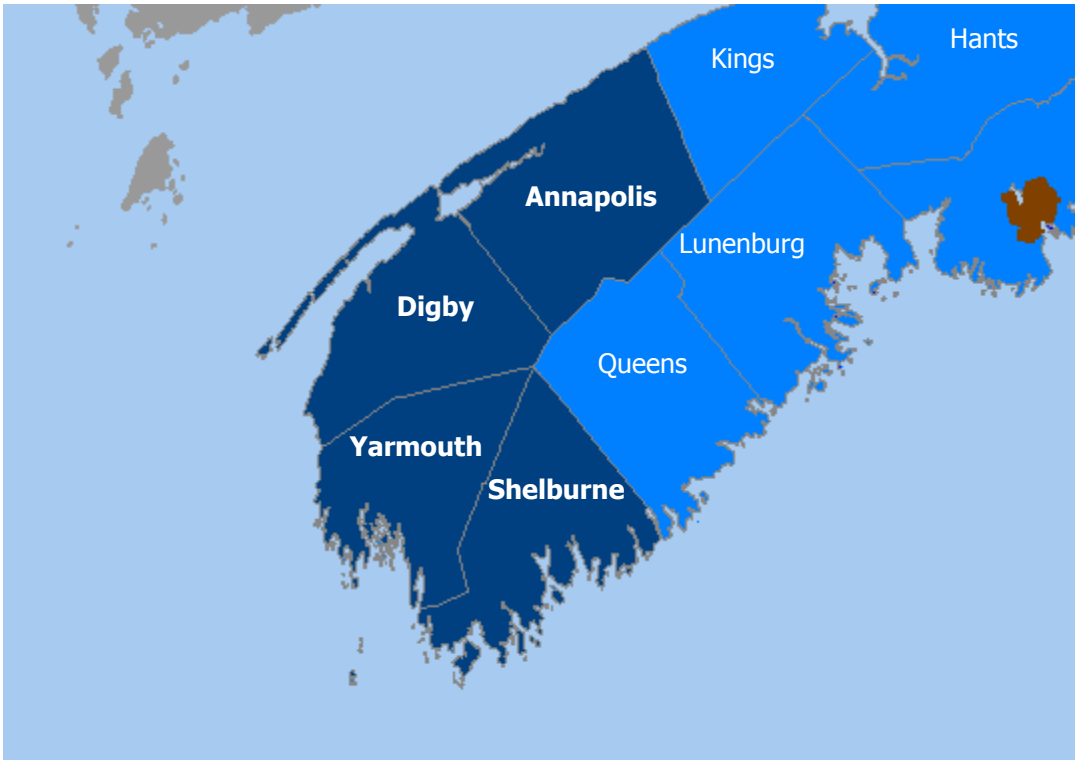
In some respects, South West Nova Scotia is the cradle of Canada. It has been settled almost continuously since Samuel de Champlain established the "Habitation at Port-Royal" in 1605, three years before the founding of Quebec.

The region is home to Acadians, descendants of New England Planters, United Empire Loyalists, Mi'kmaq and African Canadians. After being expelled from the fertile lands of the Annapolis Valley, the Acadians came back and re-established themselves on the rocky shores of the Bay of Fundy as one of the most successful fishing communities in Atlantic Canada.

The region has numerous attractions for visiting tourists, such as historic towns, whale watching in the Bay of Fundy, lighthouses, a National Park and an amusement park. Its economy is dominated by the fishery, in particular lobsters and scallops, but tourism, forestry, agriculture and manufacturing also provide livelihoods for many residents. SWNS also offers a quality of life that has attracted many people from central Canada, the United States and United Kingdom to retire.

The region is dotted with settlements all along the coastline, with a regional centre in Yarmouth and several smaller towns and villages such as Westport, Meteghan, the Pubnicos, Barrington, Shelburne, Digby, Annapolis Royal, Bridgetown and Middleton.

Figure 2-1: South West Nova Scotia and its Counties



Source: Nova Scotia Geomatics Centre, Province of Nova Scotia.

2.1.2 Population and Demographics

Unlike Nova Scotia as a whole, SWNS saw population declines between 1996 and 2006, the most recent census year. While the population of Nova Scotia rose 0.5 percent, from 909,000 in 1996 to 913,000 in 2006, in SWNS the population fell by 7.8 percent, from 89,000 to 82,000. This decline was spread fairly evenly over the four counties in the region (Figure 2-2).

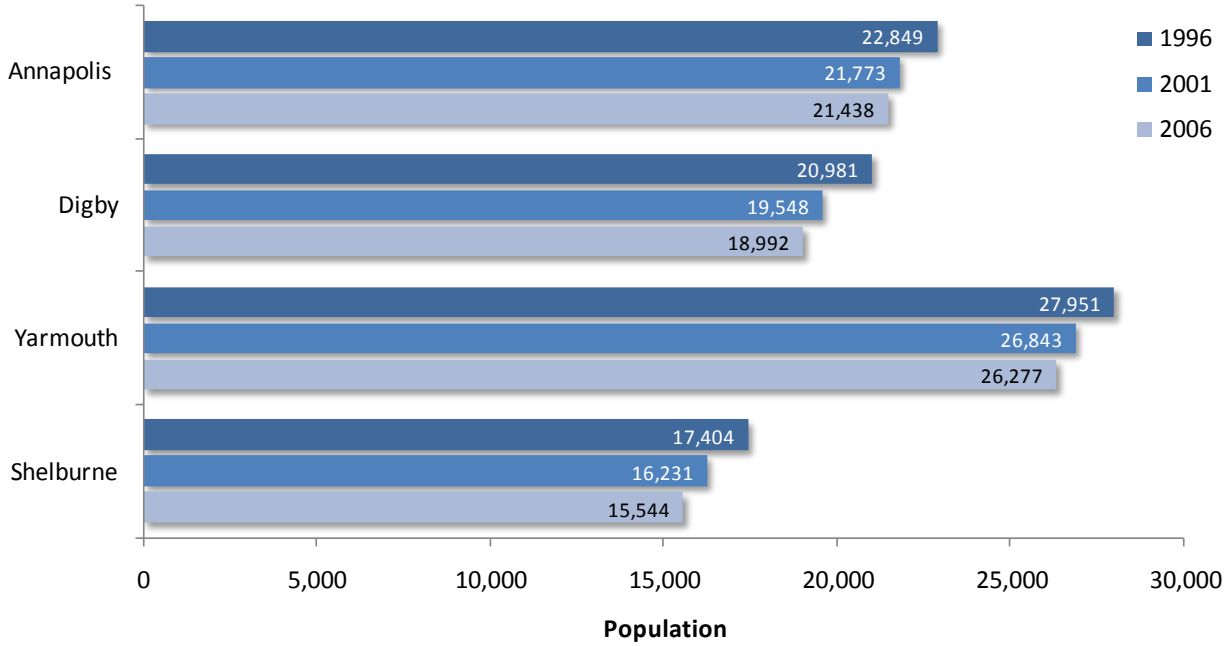
In 2006, relative to Nova Scotia as a whole, and like most of rural Nova Scotia, SWNS had an older population. The cohort aged 55 years of age and over made up a larger share of the population (32.6 percent) than in the province as a whole (28.2 percent). This population age structure suggests that relatively younger people are leaving and/or that retirees may be settling in SWNS to a greater extent than in some other parts of the province.

While middle-aged adults, youths and children are generally present in roughly similar proportions in relation to Nova Scotia as a whole, SWNS has considerably fewer young adults. In 2006, 14.8 percent of the population was aged 20 to 34, whereas in the province as a whole, the figure was 17.7 percent. This reflects the limited educational opportunities[6] in the region, including a small francophone university, and also suggests that young people are taking jobs outside of the region.

[6] There are educational institutions in and around SWNS. Acadia University in Wolfville, is nearby and there are several campuses of the Nova Scotia Community College, with the Centre of Geographic Sciences in the Annapolis Valley, and a research directorate in applied geomatics at Middleton. Université St. Anne has campuses in Tusket and Pointe-de-l'Église in SWNS.

Statistics Canada projects a continued mild decline in the population of SWNS to 2031, from 82,000 in 2006 to around 75,000 by 2031. Each of the four counties will experience declines at rates faster than the province as a whole, which will see a mild decline in population, from 913,000 in 2006 to around 900,000 by 2031.

Figure 2-2: Population, Counties of South West Nova Scotia, 1996-2006



Source: CPCS analysis of data from Statistics Canada Censuses 1996, 2001, 2006

2.1.3 Labour Force

In 2006, SWNS had a labour force of 68,310 distributed in roughly the same proportion as the population of the region.

While all counties in SWNS had higher unemployment than the provincial average (9.1 percent) in 2006, the unemployment rate was highest in Shelburne County (16.2 percent), followed by Digby County (12.9 percent), Annapolis County (11.4 percent) and Yarmouth County (11.2 percent) counties.

The employment rate (share of the employed population aged 15 and over) in SWNS was also lower than the provincial average (57.2 percent) in all counties. Yarmouth County had the highest employment rate (54.4 percent), and Annapolis County had the lowest (49.5 percent). The employment rates in Digby and Shelburne counties were respectively 51.2 percent and 51.1 percent. The participation rate, reflecting the share of the population aged 15 and over employed or actively looking for work, exhibited a similar pattern to the employment rate across the counties of SWNS in 2006.

As the labour force data at the *county* level are drawn from the Census, which is only conducted at five-year intervals, specific county data beyond 2006 are unavailable. However, to

provide a picture of more recent labour market developments, data are available for the economic regions of Annapolis Valley and Southern Nova Scotia. These two economic regions include the four counties in the study area as well as Hants, Kings, Queens and Lunenburg counties.[7] In both regions, the employment and participation rates increased in recent years, reflecting the aging of the baby-boomer cohort. This trend is likely to abate and reverse when baby-boomers begin to retire in the middle of the decade. In Southern Nova Scotia, the unemployment rate decreased between 2006 and 2008, from 11.1 percent to 9.3 percent, its lowest level since 1990. Nonetheless, it remained well above the Nova Scotia average (7.7 percent) and the Canadian average (6.1 percent).

As might be expected of a rural region, the occupational mix in SWNS shows a greater proportion of people working in manufacturing, processing and primary industry. There were fewer people in service occupations like business, finance, and administrative occupations and in natural and applied sciences and related occupations.

This occupational structure was largely mirrored at the level of the individual counties. Shelburne County tended to have a greater share of its population in occupations unique to primary industries and manufacturing and processing and less in scientific and business services, whereas Annapolis County tended to conform more to the overall provincial pattern. Digby and Yarmouth counties tended to fall somewhere in between Annapolis and Shelburne counties in terms of the occupational structure of employment.

2.1.4 Income

Median earnings in SWNS were lower in every county than in the province as a whole in 2005 (Figure 2-3).[8] This largely reflects the prevalence of part-time and seasonal employment. Whereas 50.2 percent of Nova Scotia residents with earnings worked full time all year, a smaller share of SWNS residents with earnings worked full time throughout the year. For instance, in Shelburne County, 32.7 percent of those with earnings worked full time all year. In Annapolis County the share was 43.9 percent, whereas in Digby and Yarmouth counties the share was just over 40 percent.

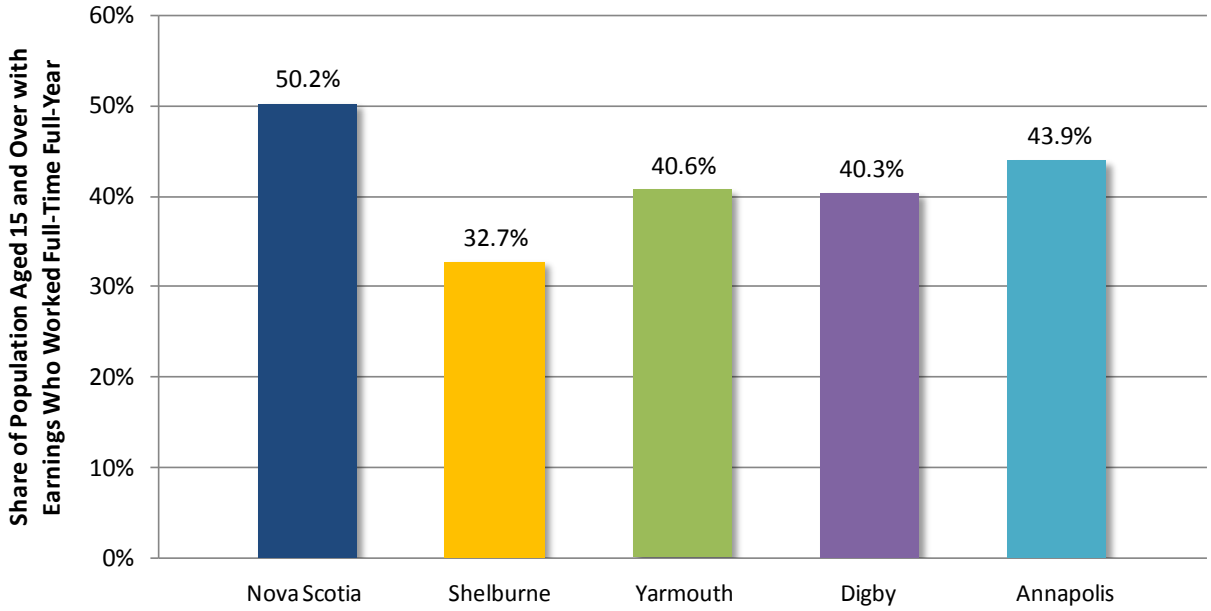
Median incomes were considerably higher than median earnings in SWNS, as was the case in the province as a whole. This gap reflects the importance of government transfers in the income of residents of SWNS. As a share of total income, government transfers (Employment Insurance, Old Age Security, social assistance, etc.) made up between 20 and 25 percent of total income in SWNS, whereas in the province as a whole, government transfers accounted for 15 percent of income.

[7] The economic region (ER) of Annapolis Valley includes the counties of Hants, Kings and Annapolis. In 2006, Annapolis County accounted for only 17 percent of the ER, and had a significantly higher unemployment rate and much lower median earnings. On the other hand, the ER of Southern Nova Scotia was much more representative of the study area, with the counties of Digby, Yarmouth and Shelburne accounting for more than 50 percent of the ER population, and the counties of Queens and Lunenburg socio-economically similar to the county of Annapolis.

[8] Income data from the Census are reported for the year prior to the year in which the Census is taken, e.g. income data for the 2006 Census reflect the year 2005. This is the latest year for which data were available.

As noted above, SWNS has a higher share of elderly residents than Nova Scotia as a whole, so higher shares of government transfers in total income in part reflect the greater relative importance of Old Age Security and Canada Pension Plan payments.

Figure 2-3: Share of Population 15 and over with earnings who worked full time and full year, Percent, 2005



Source: CPCS analysis of Statistics Canada Census 2006

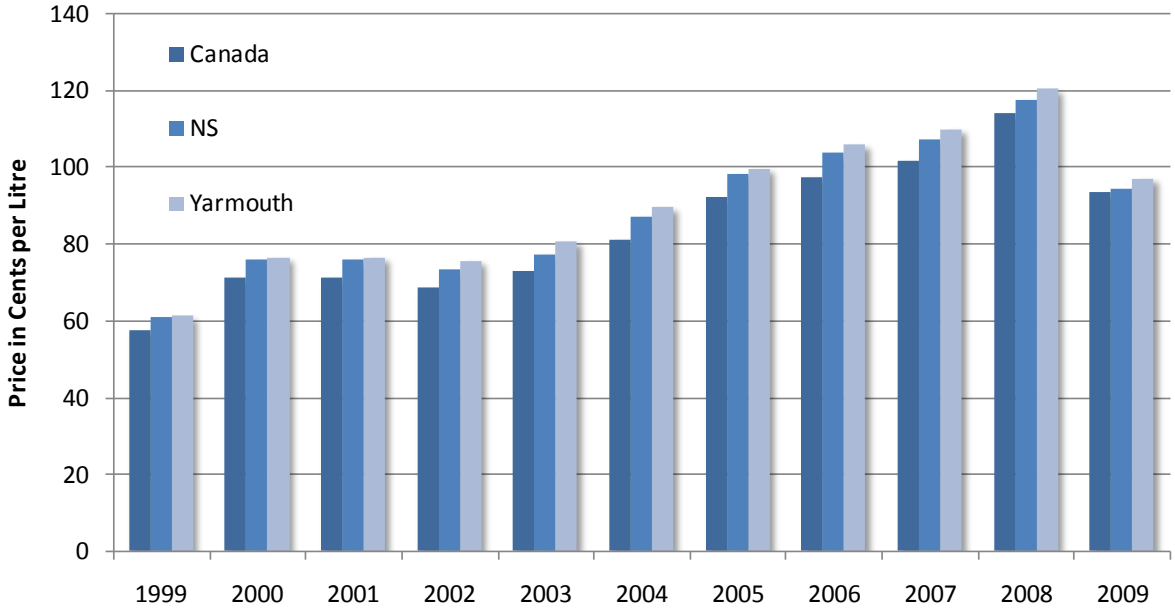
2.1.5 Fuel Prices

Two points are noteworthy with respect to fuel prices in SWNS. First, prices have risen significantly over the past decade, although a peak was reached in 2008 and prices in 2009 receded to levels similar to those of 2004-2005. These rising fuel costs have pushed up overall costs and have caused many companies in SWNS to make operational adjustments. In cases where increases in fuel costs cannot be passed on to customers, margins have suffered or operations have been curtailed.

Second, diesel fuel in Yarmouth is more expensive than in Halifax, and diesel fuel in Halifax is more expensive on average than in Canada. The difference between Canada and Halifax is explained by higher fuel taxes in Nova Scotia than in Canada as a whole, and price regulation, which was introduced in July 2006. The difference between Halifax and Yarmouth, between 2 and 3 cents per litre since 2007, is likely to be largely the result of higher transportation costs and greater margins allowed rural retailers.

Prices for regular gasoline prices have followed a similar pattern to diesel prices.

Figure 2-4: Average Diesel Fuel Prices, Annual Average Tax Inclusive, 1999-2009



Source: CPCS analysis of data from Natural Resources Canada website.

2.1.6 Summary of the Overview of South West Nova Scotia

SWNS is a rural region and this fact is reflected in social and economic data. The population is composed of a greater share of older people, since many young adults have left for the cities or other regions to pursue work and educational opportunities. An older population means a smaller share of the adult population participates in employment and that incomes are correspondingly lower and more heavily drawn from government transfers relative to Nova Scotia as a whole. The relative importance of different groups of occupations is also typical of a rural economy, with larger shares of people in occupations unique to the manufacturing and primary industries and smaller shares in the professional services. Finally, employment is less likely to be full time and full year than in the province as whole.

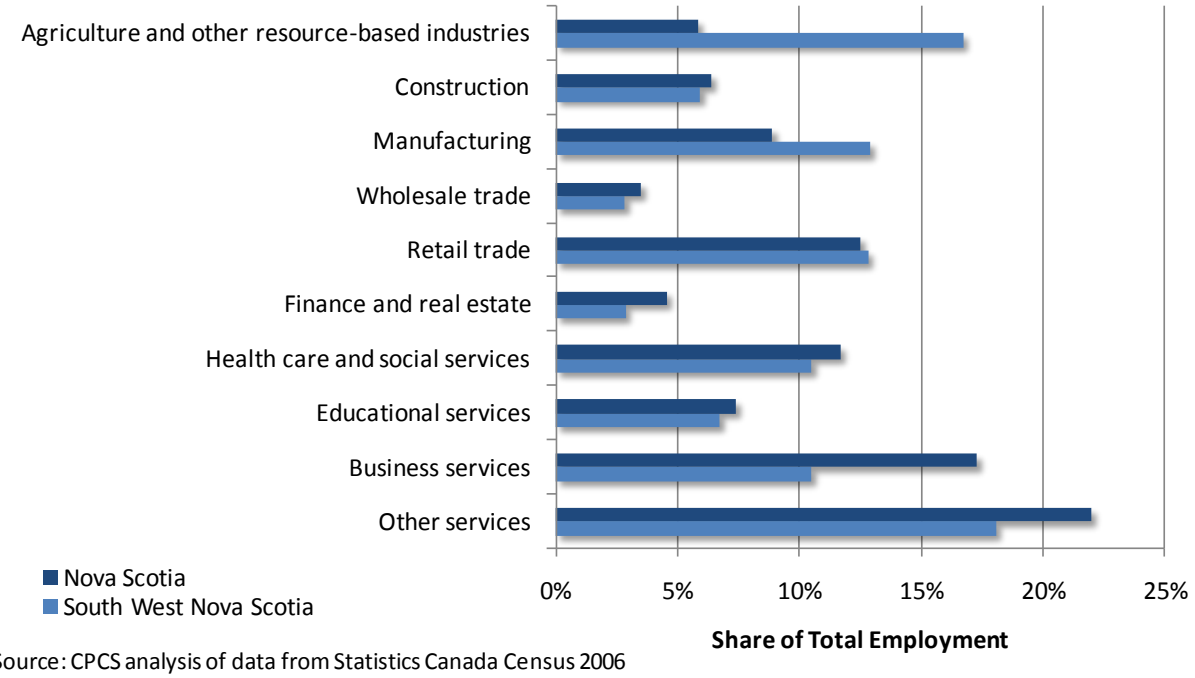
2.2 Key Industries

SWNS has a somewhat different employment structure than the province as a whole (Figure 2-5). There are larger shares of employment in agriculture, resource-based industries and manufacturing. There are relatively smaller shares employed in finance and real estate, business services, and other services. This distribution of employment by industry is consistent with SWNS being a rural area.

Employment data on the economic region of Southern Nova Scotia (counties of Shelburne, Yarmouth, Digby, Queens and Lunenburg) from the Labour Force Survey indicates that among resource industries, agriculture accounts for about 20 percent of employment, with forestry and

particularly fishing being larger.[9] This pattern is reflected in the detailed occupational data shown in Figure 2-6. Only 17 percent of workers in primary industry occupations were employed in occupations unique to agriculture in SWNS in 2006. Occupations unique to fishing, forestry or mining, oil and gas were much more important than agriculture in Shelburne County (92 percent), Yarmouth County (81 percent) and Digby County (58 percent). Annapolis County, with an economy relying much less on primary industries, had more workers in occupations unique to agriculture than in occupations unique to forestry, fishing or mining and oil and gas.

Figure 2-5: Share of Total Employment by Industry, South West Nova Scotia, Percent, 2006

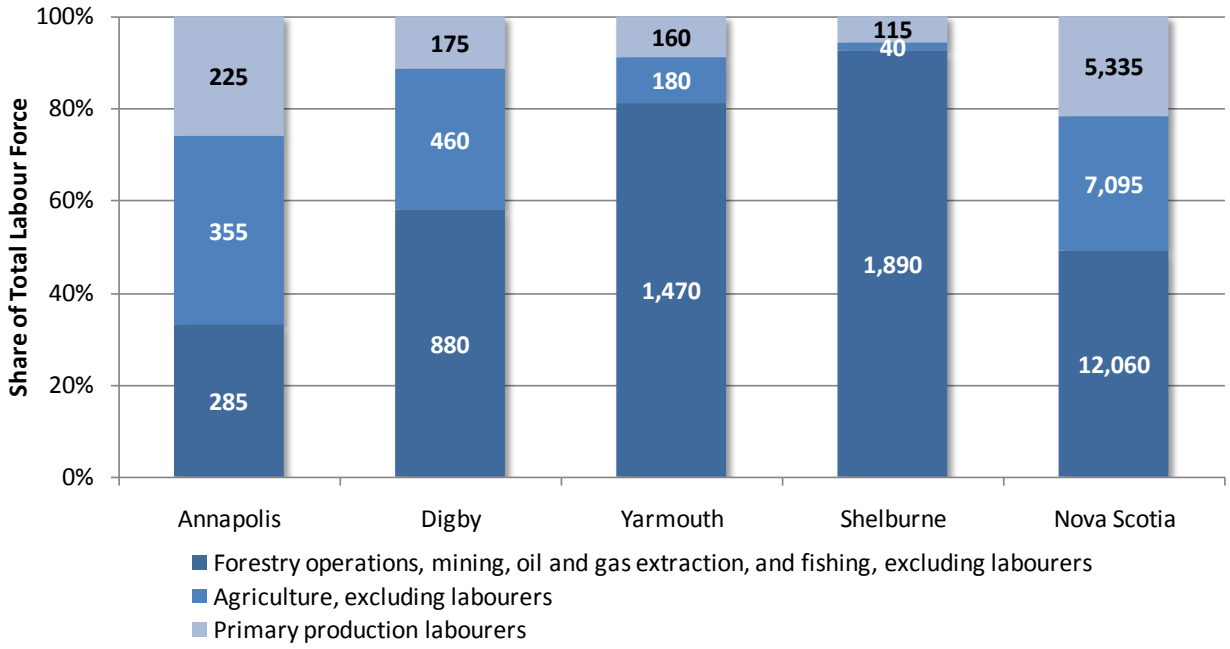


Source: CPCS analysis of data from Statistics Canada Census 2006

Data on employment by industry since 2006 are only available at the economic region level. While primary industries and manufacturing remain drivers of the economy in SWNS, their relative importance has declined over time. Figure 2-7 shows that the goods-producing sector has been in steady decline, with its relative weight in employment in the economic region of Southern Nova Scotia falling from 41,000 in 1987 to 33,000 in 2008. This decline was in large part due to the declining importance of manufacturing in the region's employment.

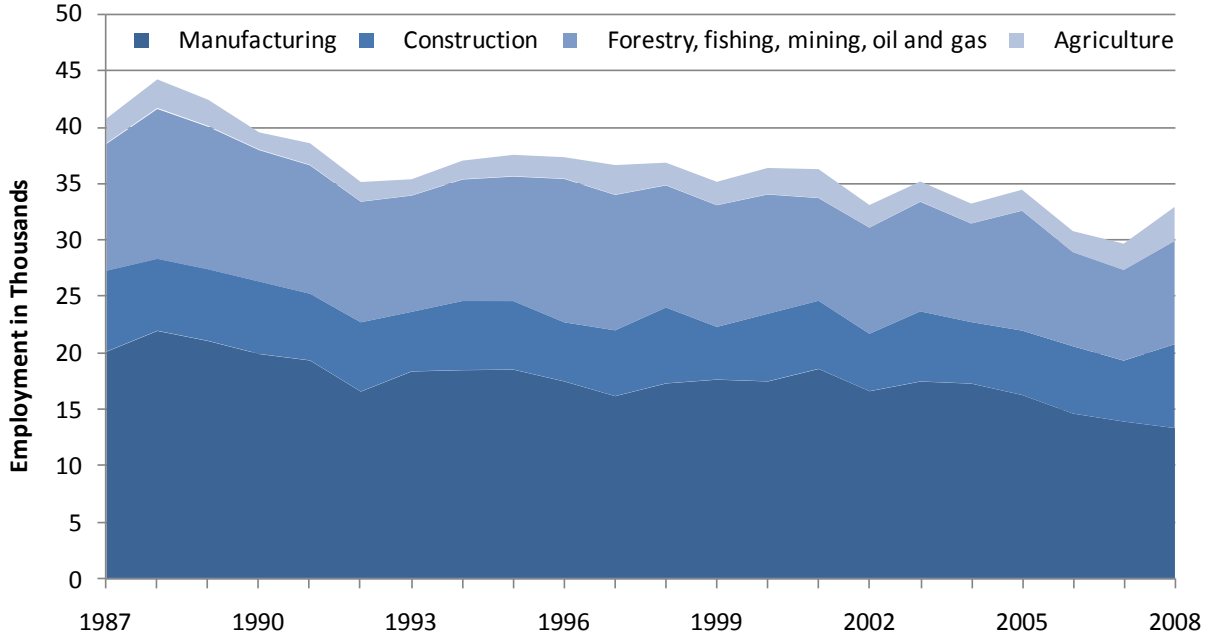
[9] The data do not permit the identification the number of workers in fishing or forestry separately at the level of economic regions, since the only figures reported are for occupations unique to forestry operations, mining, oil and gas extraction, and fishing.

Figure 2-6: Share of Employment and Number of Employed by Occupations Unique to Primary Industries, Counties of South West Nova Scotia, Percent, 2006



Source: CPCS anaylsis of data from the Statistics Canada Census 2006

Figure 2-7: Employment by Industry in the Economic Region of Southern Nova Scotia, Goods-producing Sector, Thousands, 1987-2008



Source: Statistics Canada Labour Force Survey

The decline in manufacturing employment in the region, both absolute and relative, reflects a national trend. Nonetheless, given the relative importance of manufacturing to the region, the impact of the decline on the local economy cannot be overstated. The industries which grew most in relative importance since 1987 were health care and social assistance, business, building and other support services, information, culture and recreation, and to a lesser extent accommodation and food services. These increases reflect an aging population, a booming construction sector and a relatively good performance of the tourism industry.

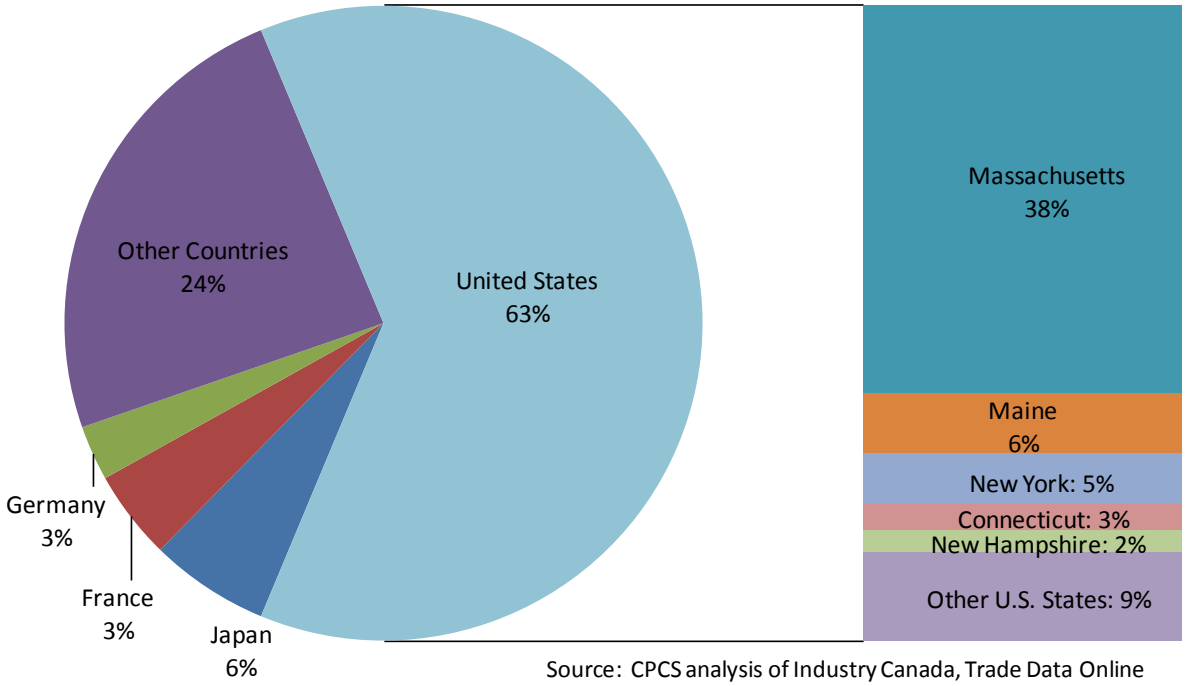
In sum, SWNS is a rural economy focused on resource-based industries, particularly fishing, both primary and processing (manufacturing) activities. This pattern is most pronounced in Shelburne and least in Annapolis. The relative size of manufacturing in the region has declined over the last 20 years, but it remains one of the key economic drivers.

2.2.1 Fishery

2.2.1.1 Overview

The fishing industry has always been a pillar of the SWNS economy. According to Department of Fisheries and Oceans, in 2008 the value of fish landings in the region was $365 million, a decrease from $436 million in 2003.

Figure 2-8: International Exports of Fish by Final Destination, Crustaceans, Molluscs and Other Aquatic Invertebrates from Nova Scotia, by Value, Percent, 2008



Source: CPCS analysis of Industry Canada, Trade Data Online

In 2006, the latest year for which detailed data were available, fish and seafood exports amounted to $974 million[10] (including processed seafood), representing about 19.1 percent of

[10] According to Industry Canada online data, total Nova Scotia fishing and seafood product preparation exports in 2009 were $820 million. See http://www.ic.gc.ca/sc_mrkti/tdst/tdo/tdo.php#tag

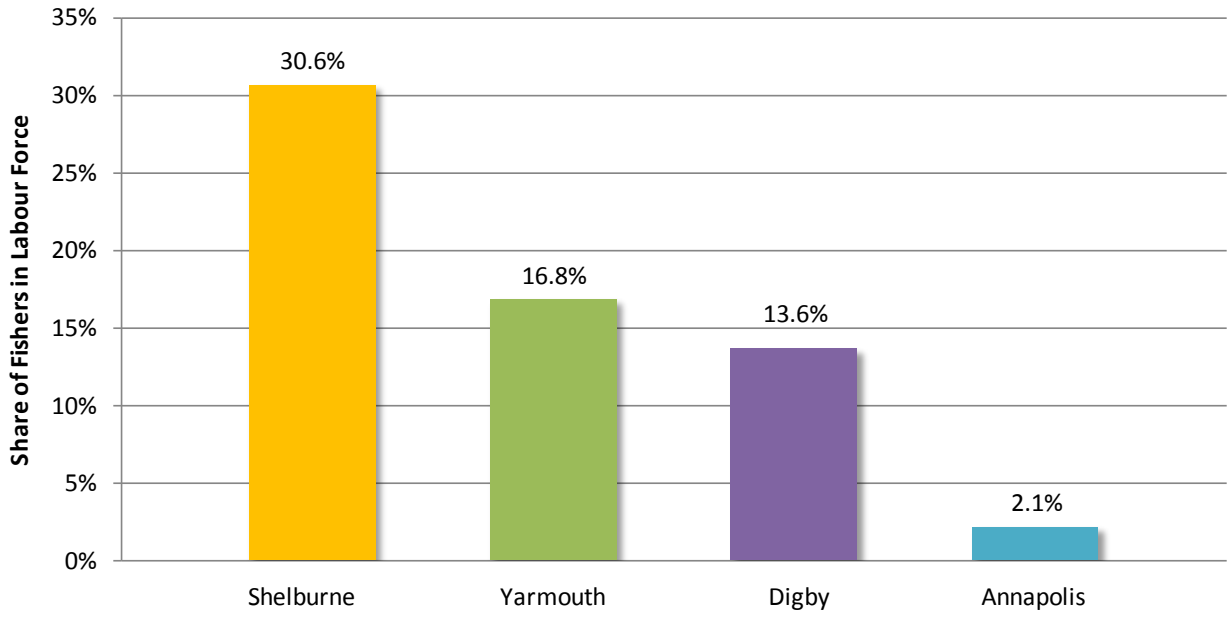
Nova Scotia's exports, with roughly 60 percent of these exports going to the American market. The fishing industry (excluding processed goods) accounted for about one-third of these exports. Live lobster accounted for 34 percent of Nova Scotia's fish and seafood exports, followed by frozen shrimp (11 percent), frozen snow crab (7 percent), frozen scallops (7 percent) and frozen lobster (5 percent).[11] As shown in Figure 2-8, Massachusetts is by far the most important export market for Nova Scotia's seafood. Figures for exports to US states do not include re-exports of Nova Scotia seafood to third countries; such re-exports are captured in the figures for exports to other countries.

The fishery also generates a large amount of secondary activity and backward linkages to the rest of the economy of SWNS. For example, as of April 2009, Nova Scotia had 253 licensed fish plants and 408 licensed fish buyers (Department of Fisheries and Aquaculture). Given that the industry is mainly export-oriented, it also generates transportation activity, particularly to the United States, central Canada, Europe and Japan.

2.2.1.2 Role of the Fishery in Regional Economy

The fishing industry also forms the economic base of many of Nova Scotia's coastal communities. In 2005, SWNS had 6,106 fishers, representing roughly 15 percent of the regional labour force. It is also important to note that the fishery is very active in the fall and winter, providing an important offset to the low level of tourism during these periods, especially in the winter.

Figure 2-9: Share of Fishers in Labour Force, Counties of South West Nova Scotia, 2005



Source: CPCS analysis of Statistics Canada Census and Nova Scotia Statistical Review

[11] Fast Facts: Nova Sccotia Fish Landings, prepared prepared by Marketing Services, Nova Scotia Department of Agriculture, available at http://www.gov.ns.ca/fish/marketing/statistics/FastFacts_97-07.pdf

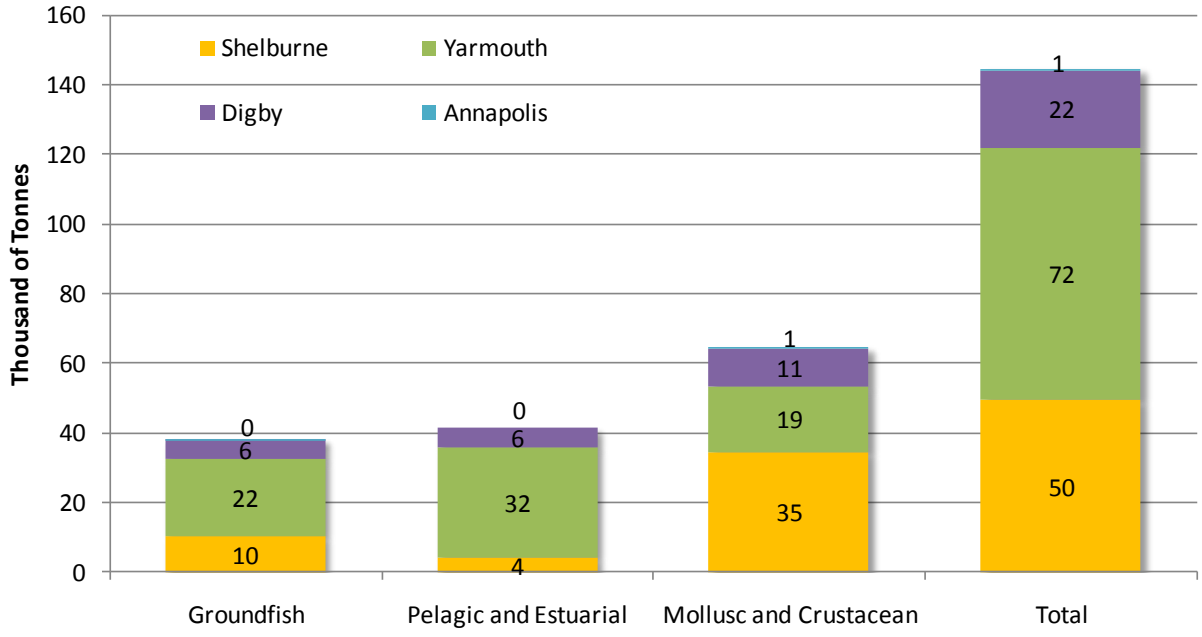
Figure 2-9 shows that there were large differences across counties in the importance of fishing as a source of employment. While fishing was least important in Annapolis County, it has a large share of employment in Yarmouth and Digby counties, and was of particular importance in Shelburne County where one-third of the labour force fished for a living. Given that the number of fishers represents only the direct impact on employment of the fishing industry, it is clear that fishing is one of the key economic drivers in the region.

Of the 18 counties of Nova Scotia, the top three counties in terms of fish landings by volume were in SWNS. They were, in order of importance, Yarmouth, Shelburne, and Digby counties (Figure 2-10). In 2005, (the latest year for which data is available) these three counties accounted for more than one-half the volume (53.1 percent) and value (56.0 percent) of fish landings in the province. As noted earlier, Annapolis County plays only a marginal role in the fishing industry. These trends are confirmed by Natural Resource Canada indicators which identified fishery-reliant communities across Canada.[12] Communities around Shelburne and Yarmouth counties were rated as solely (80 percent to 100 percent) or highly (65 percent to 79 percent) reliant on fisheries, while communities around Digby were rated moderately reliant (30 percent to 49 percent) on fisheries.

The commercial fishery targets over 30 species, which are divided into three categories: groundfish; pelagic and estuarial; and molluscs and crustaceans. In SWNS, as in the rest of the province, fishing is dominated by molluscs and crustaceans (e.g. lobster, snow crab, shrimp and scallops). In 2008, molluscs and crustaceans accounted for 45 percent of landings volume and 80 percent of landing value. In SWNS as a whole, groundfish (e.g. cod, haddock, halibut) accounted for 26 percent of fish landing volumes and pelagic and estuarial species (e.g. herring, swordfish, tuna) accounted for 29 percent.

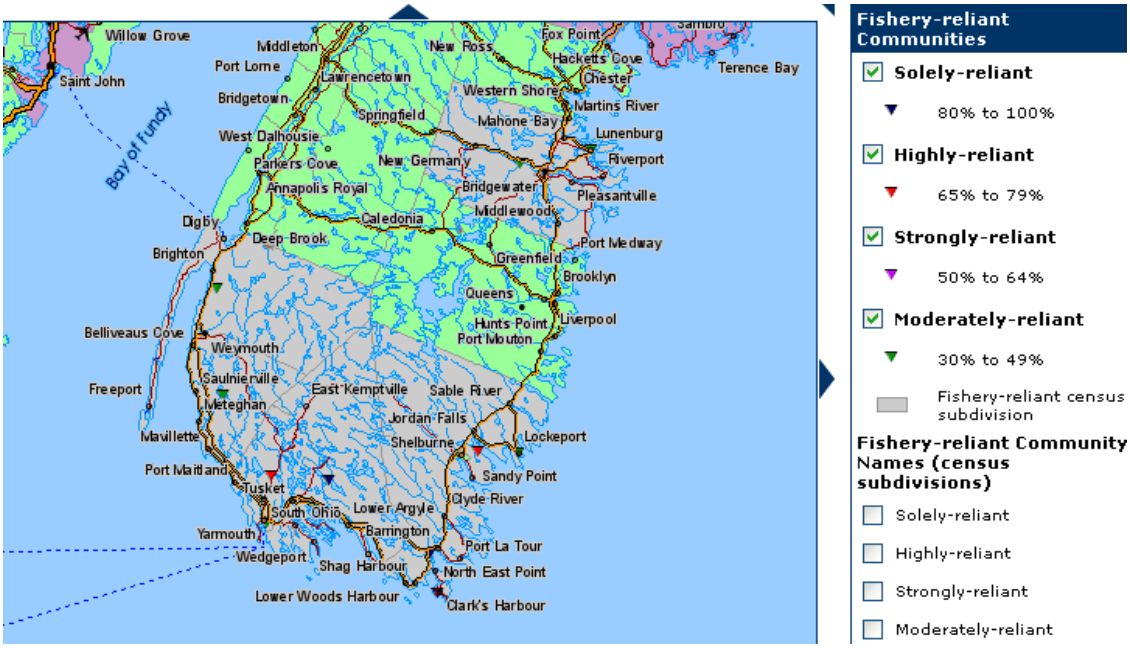
[12] The indicator identifies the percentage of the economic base, that is, the economic activity which stems from selling products and services outside the community that is accounted for by fisheries. Indicator of forestry-reliance, mining-reliance, agriculture-reliance and energy-reliance are also available.

Figure 2-10: Fish Landings Volumes by Type, Counties of South West Nova Scotia, 2008



Source: CPCS analysis of data from the Department of Fisheries and Oceans

Figure 2-11: Fishery-Reliant Communities, 2001[13]



Source: Atlas of Canada

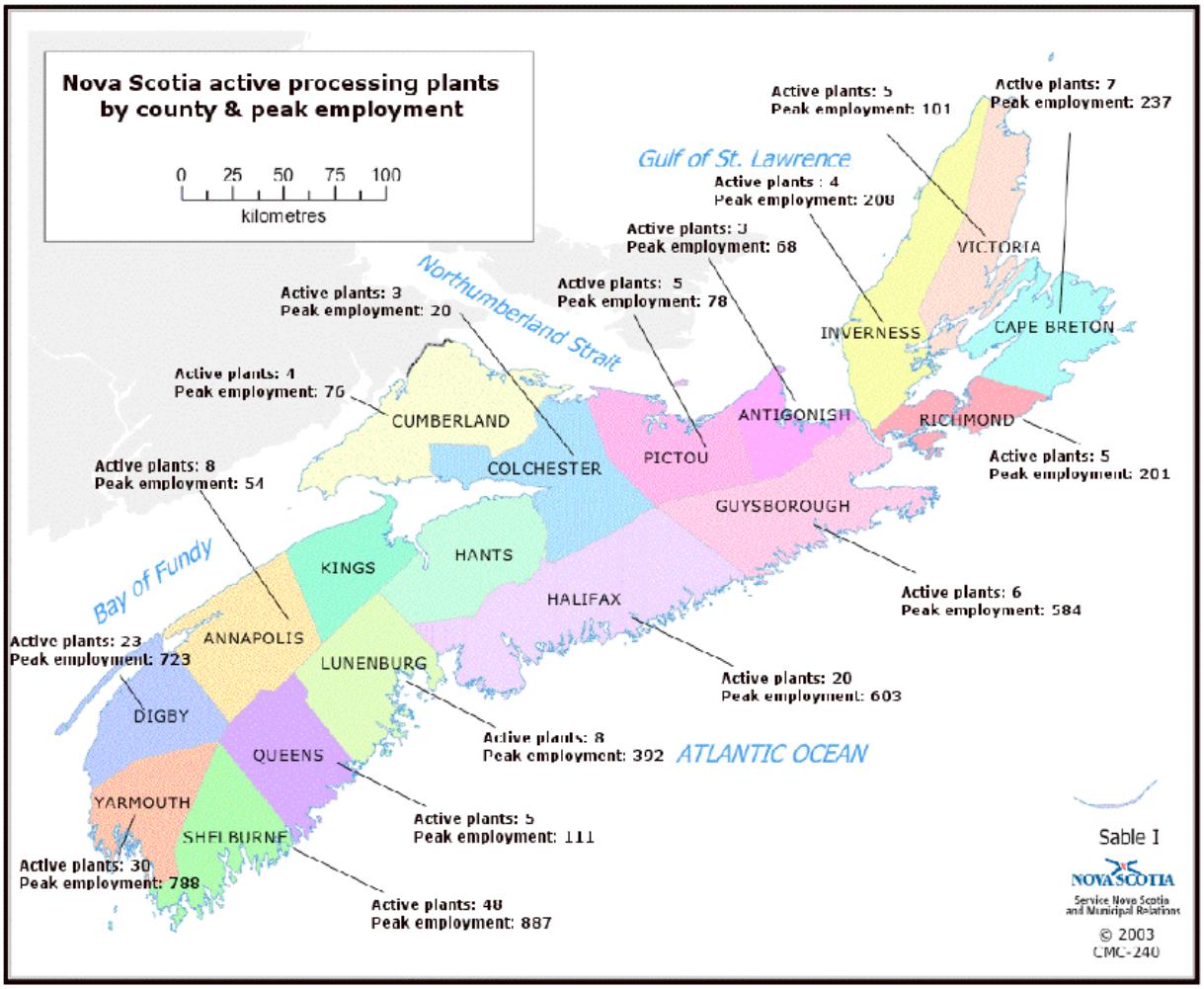
Fish is processed in the same parts of the region as it is caught. Indeed, the concentration of seafood processing plants is largely in line with key fishing areas in Nova Scotia. The industry is fragmented and independent from the harvesting sector, explaining the need for processors to

[13] 2001 data were the most recent available at the time of writing.

locate near fishing communities to maintain a strong relationship with their suppliers of raw material.[14]

Figure 2-12 provides a summary of the active seafood processing plants by county. In 2003, Digby, Yarmouth and Shelburne counties each had more than 20 active plants, employing more than 700 persons in each county. The average plant peak employment was between 18 (Shelburne County) and 31 (Digby County). This industry is much smaller in Annapolis County, with eight plants and peak employment of 54. These plants do not all primarily conduct processing activities. Indeed in SWNS, a large portion focuses on shipping lobster (about 30) while another portion act as intermediaries between sellers and buyers (about 17).

Figure 2-12: Active Seafood Processing Plants and Peak Employment, Nova Scotia, 2003



Source: Service Nova Scotia

2.2.1.3 Industry Trends

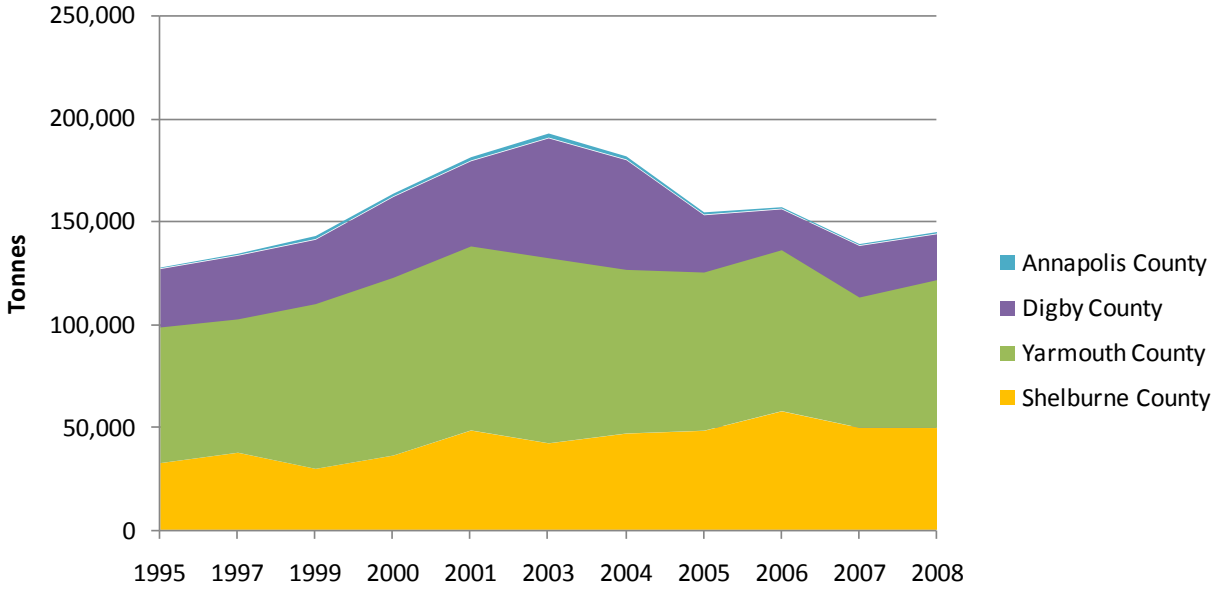
From the mid-1990s to 2003, all counties in SWNS displayed strong growth in fish landing volumes (Figure 2-13). In 2004 and 2005, however, landings declined substantially in Yarmouth

[14] Gardner Pinfold, 2007.

and Digby counties, while they continued to trend upward in Shelburne County. In Digby County, volumes almost fell by half between 2004 and 2005, from 53,260 metric tonnes to 27,819 metric tonnes. In value, however, landings in Digby County remained practically identical between 2004 and 2005, suggesting a change in price conditions or the composition of landings rather than simply a decline in the resource base.

The volume of landings seems to have stabilized around the 150,000 metric tonnes for the SWNS region as a whole, down from a peak of about 190,000 metric tonnes in 2003. Prices have stayed high enough to offset part of the decline in fish volumes, with the value of landings in 2005 only about 5 percent below their 2003 peak in the region. The future of the industry will not only depend on a sustainable resource base, but given its export-orientation, the international demand for its products. In fact, the recent decline in lobster prices, largely related to the 2008-09 economic crisis and oversupply, is threatening the livelihood of thousands of fishers and reflects the importance of international and American markets for the survival and prosperity of the industry.[15]

Figure 2-13: Fish Landings Volumes, Counties of South West Nova Scotia, Metric Tonnes, 1995-2008



Source: CPCS analysis of data from the Department of Fisheries and Oceans

The 2007 Gardner Pinfold report on the Nova Scotia seafood processing sector[16] identifies a number of issues which have hampered the growth of the seafood processing industry: declining resources, competition from low-cost producers, rising raw material costs, increasing concentration of buying power in major markets, adverse exchange rate movements and the regulatory environment as it affects the terms and conditions of access to raw material.

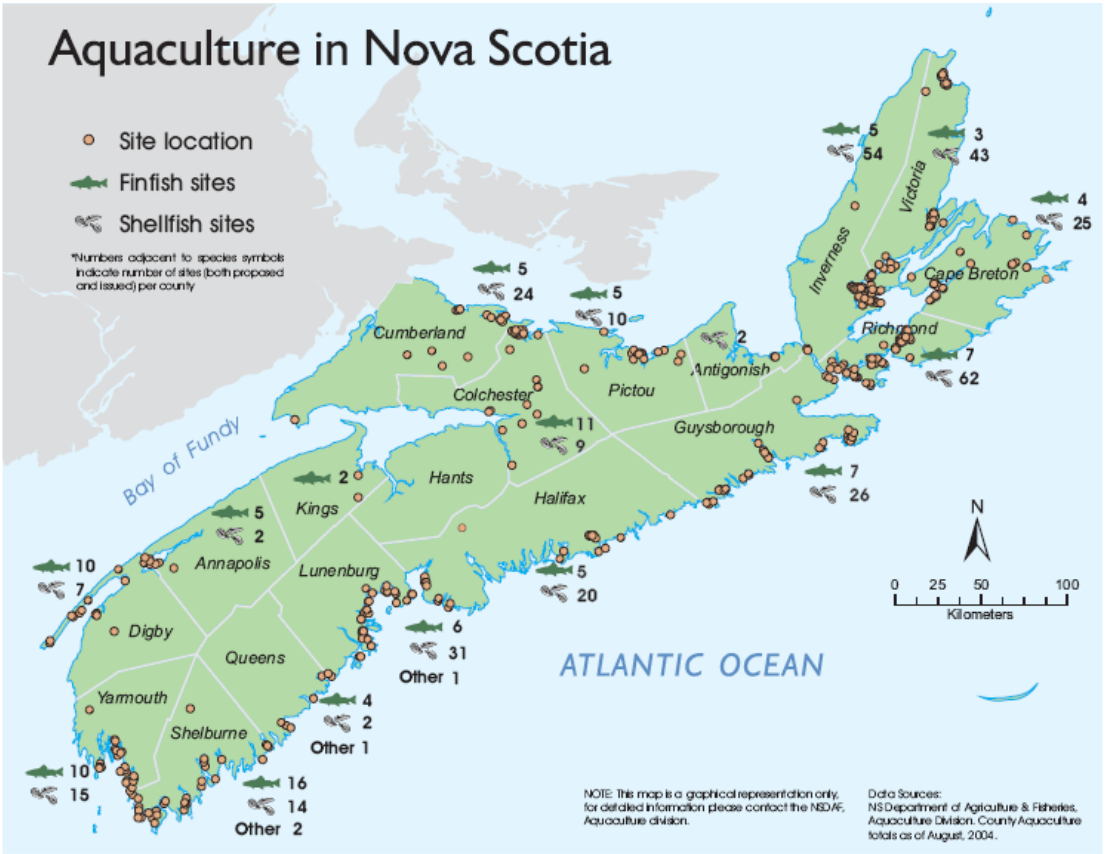
[15] http://www.workingwaterfront.com/online-exclusives/Canadian-lobstermen-face- percent98total-disaster/13156/

[16] Gardner Pinfold, "Nova Scotia Seafood Processing Sector: State of the Industry and Competitiveness Assessment", Nova Scotia Department of Fisheries and Agriculture, August 2007.

In recent years, the industry was sustained mainly by the strong performance of the lobster and crab industry. Apart from these two segments, the processing sector has seen limited success, with investment in new plant and equipment stalling, and the financial performance of many plants deteriorating. Stronger competition in the global market for seafood, spurred by the rise of aquaculture, has squeezed margins. In addition, the rise of the Canadian dollar against the US dollar has reduced revenues for processors exporting to US markets. While price increases did offset this trend temporarily, prices for lobster have declined in the recent recession.

While conventional fishing is by far the largest sector of importance in the fishing industry, there are other activities related to fishing which are emerging. In particular, aquaculture is gaining importance in Nova Scotia.

Figure 2-14: Aquaculture Sites, Nova Scotia, August 2004



Source: Nova Scotia Department of Fisheries and Aquaculture

Globally, aquaculture has grown quickly, increasing its share of fish supplied from 3.0 percent in 1970 to 27.3 percent in 2000.[17] In Nova Scotia, growth in aquaculture has also been rapid in recent years, but scope for future expansion remains. While production in Nova Scotia increased from 1,196 tonnes in 1990 to 10,181 tonnes in 2007, it still represented less than 4.0 percent of all fish production in the province. As shown in Figure 2-14, a large portion of the sites for

[17] http://www.gov.ns.ca/fish/aquaculture/FullReport.pdf

aquaculture are currently located in the Cape Breton region. However, subject to suitable ambient water temperatures for finfish aquaculture, there seems to be scope for growth in SWNS.

2.2.1.4 Major Players

The fishing industry is composed mainly of owner/operators. On average, in SWNS the number of fishers per vessel is around three, similar to the ratio in Nova Scotia as a whole. The major players are generally found up the value chain, in the seafood processing industry. In this context, the major stakeholders in the industry are overwhelmingly small fish-packing businesses and self-employed fishers, most of which are members of fishers' associations such as the Gulf Nova Scotia Bonafide Fishermen's Organization or members of the Nova Scotia Fish Packers Association. Larger producers are members of the Seafood Producers' Association of Nova Scotia.

Some of the larger businesses in fish processing in SWNS are described below.

Figure 2-15: Major Players in Fish Processing in South West Nova Scotia

Company	Description
Clearwater Seafoods	Major seafood producer with plants in Shelburne and Lockeport. User of the Digby-Saint John ferry.
Comeau's Seafoods Limited	According to SWSDA employs 500 people in Digby County (Clare Municipality).
Connor Brothers	Although based in New Brunswick, Connor Bros. Clover Leaf Seafoods has extensive business relationships with several seafood producers in Nova Scotia. Annually, Connor Brothers sells around 4,000 tonnes of bait for the lobster and mink industries in SWNS and purchases over 4,000 tonnes of herring from processing plants in the Yarmouth area. All of this product is shipped on the Digby-Saint John ferry.
Sea Star	Based in Clark's Harbour, Sea Star employs 90 people. It ships around 3,500 tonnes of product to the US market via the Digby ferry and imports 1,400 tonnes of fresh product from the US on the backhaul.

2.2.2 Forestry

2.2.2.1 Overview

The Canadian forest products industry has been in long-term decline as a result of competition from lower cost producers abroad. In recent years the decline of the US housing market, the softwood lumber dispute, and the decline of print media have all contributed to the continuing and painful adjustment. SWNS has been directly affected by these developments.

2.2.2.2 Role of Forestry in Regional Economy

Wood harvested in SWNS had previously gone to supply the Bowater Mersey paper mills in Liverpool and Bridgewater and the J.D. Irving plant in Weymouth.[18] Wood chips from the Weymouth plants were then shipped on the Digby-Saint John ferry to the pulp mill in Saint John. The sawmill closed in 2006.

[18] Marc Johnson, "Peripheral But Vigourous: South Western Nova Scotia," The Canadian Institute for Research on Regional Development, 2002.

2.2.2.3 Industry Trends

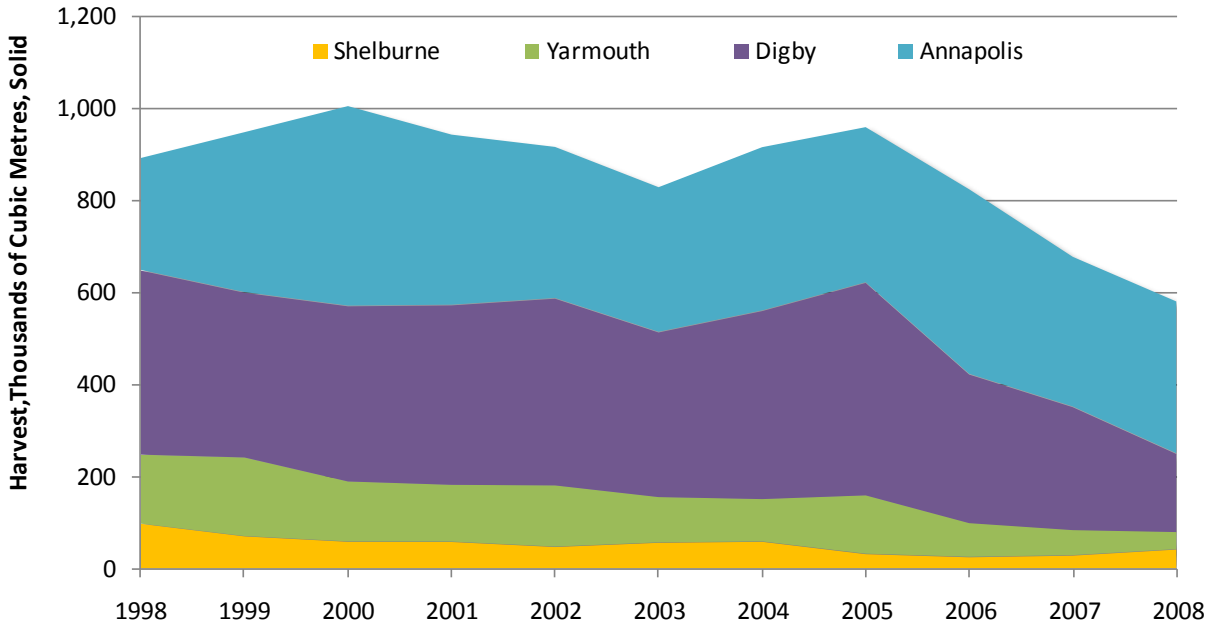
Since the late 1990s and early 2000s, all counties of SWNS have experienced declines in forest production, measured by the harvest of solid wood, both softwood and hardwood. After peaking at more than 430,000 cubic metres in 2000, the harvest in Annapolis County has declined 24 percent to 2008. Digby County experienced the most dramatic decline in harvest, with a fall of 63 percent from 2005 to 2008, from over 450,000 cubic metres to 170,000 cubic metres.

Figure 2-16: Bowater Mersey Paper Mill in Brooklyn, NS

Source: CPCS

Both Yarmouth and Shelburne counties experienced declines since the late 1990s. In Yarmouth County, output fell 75 percent from 1998 to 2008, while in Shelburne County production was down by 58 percent over the same period.

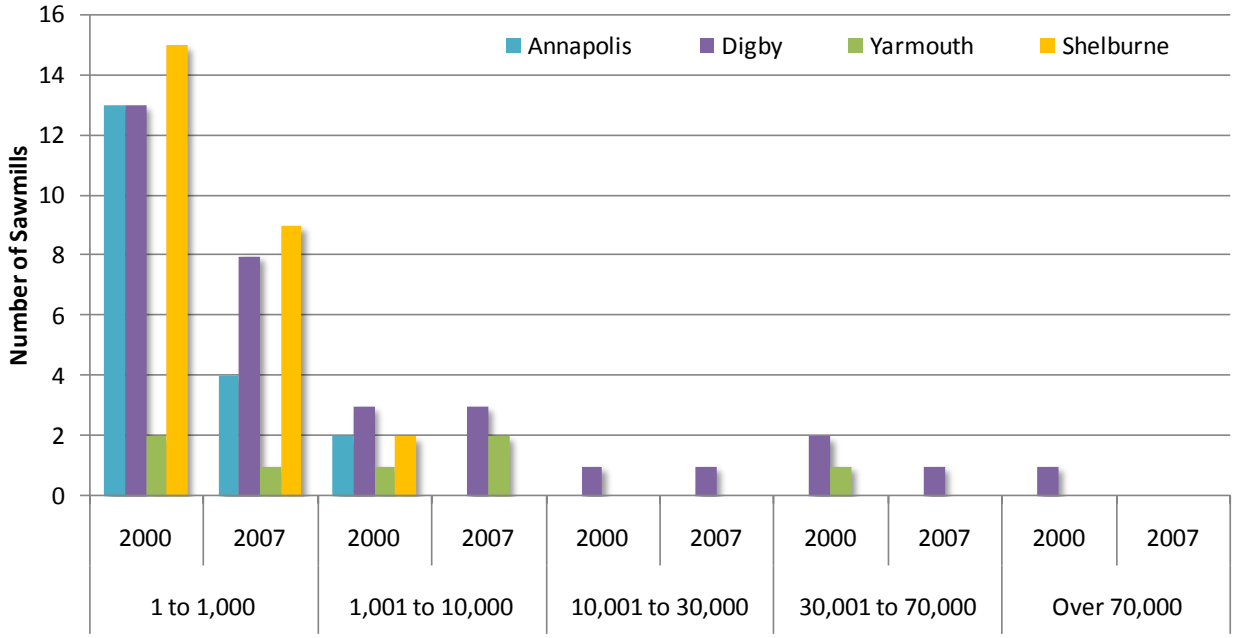
Figure 2-17: Forest Production, Total Harvest of Solid Wood, 1998-2008



Source: CPCS analysis of data from Nova Scotia Department of Natural Resources Registry of Buyers, 2007-2008, and Nova Scotia Statistical Review, 1999-2007. Softwood and hardwood.

The decline of forest production in Digby County is the most notable trend in forestry in SWNS. Overall, forest production in SWNS has fallen 35 percent between 1998 and 2008.

Figure 2-18: Number of Sawmills by Acquisition Class in Cubic Meters, Counties of South West Nova Scotia, 2000 and 2007



Source: CPCS Analysis of Registry og Buyers of Primary Forest Products 2007 and 2000.

SWNS also has a number of active sawmills. As shown in Figure 2-18, sawmills tend to be very small in the region, with the largest acquiring less than 70,000 cubic meters of wood in 2007 (Comeau Lumber Ltd). Digby County has most sawmills. Yarmouth was the only other county with a sawmill acquiring more than 1,000 cubic meters of wood.

Wood manufacturing has not fared much better than forestry and logging. Three of the four largest sawmills operating in SWNS in 2000 were not operating in 2007: J.D. Irving in Weymouth, Eagle Timber in Meteghan and Ibbitson Sawmills in Yarmouth. The last one of the big four, Comeau Lumber, closed down in January 2009. These trends are also reflected in the number of small sawmills in operation, which has decreased across all counties between 2000 and 2007.

One positive development for the region's wood processing industry has been the expansion of activity by Lewis Mouldings and Wood Specialities, a Weymouth company with roughly 60 employees. The company, which produces both large rough cuts and precision high grade pieces such as base boards, is now the biggest sawmill in SWNS, based on wood purchases. A provincial loan facilitated the expansion and allowed the company to build the facilities necessary to its new product line.[19]

[19] http://www.gov.ns.ca/news/details.asp?id=20070724001

2.2.2.4 Major Players

Bowater Mersey, located in Liverpool, outside the study area, sources fibre from the interior of Nova Scotia, including SWNS. Located in Weymouth, Lewis Mouldings manufactures door jambs, baseboards, casings, and brick moulds from eastern white pine. It operates both a wood product manufacturing facility and a sawmill.

2.2.3 Agriculture

2.2.3.1 Overview

Agriculture in SWNS is most important in Annapolis and Digby counties, less important in Yarmouth County, and minimal in Shelburne County.

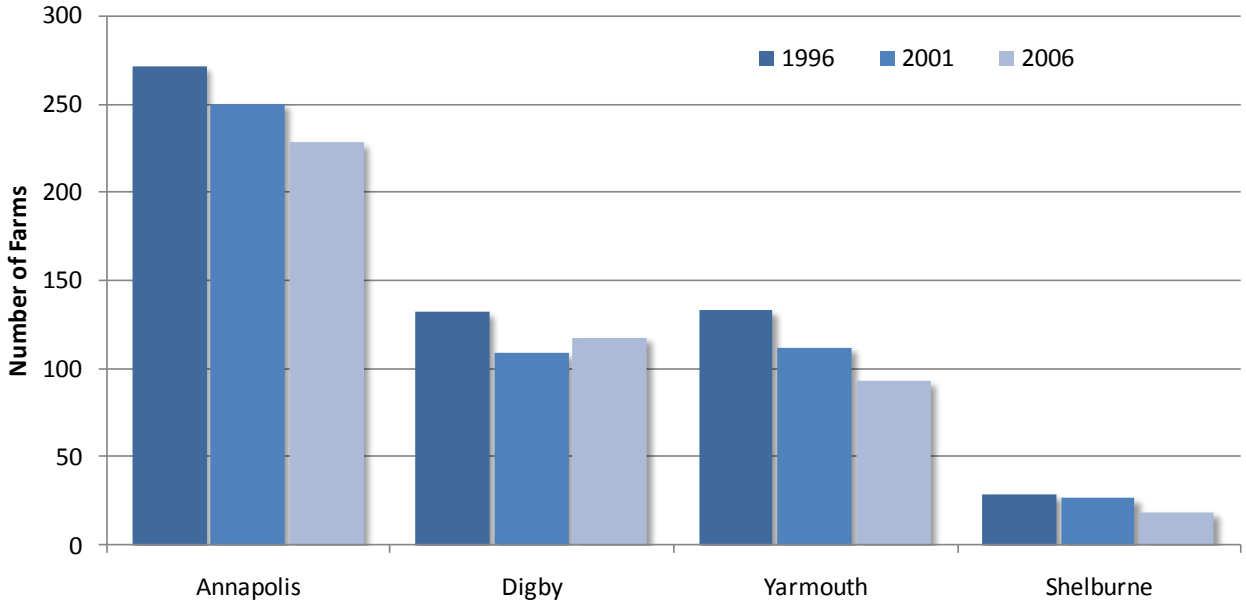
2.2.3.2 Role of Agriculture in the Regional Economy

Agriculture employed over 600 operators in 2006 not including supporting workers. Total receipts in 2006 were $68.5 million. Agriculture is particularly important as a source of income for the region, as agricultural commodities like furs, fruit, and beef can be sold in markets outside SWNS.

2.2.3.3 Industry Trends

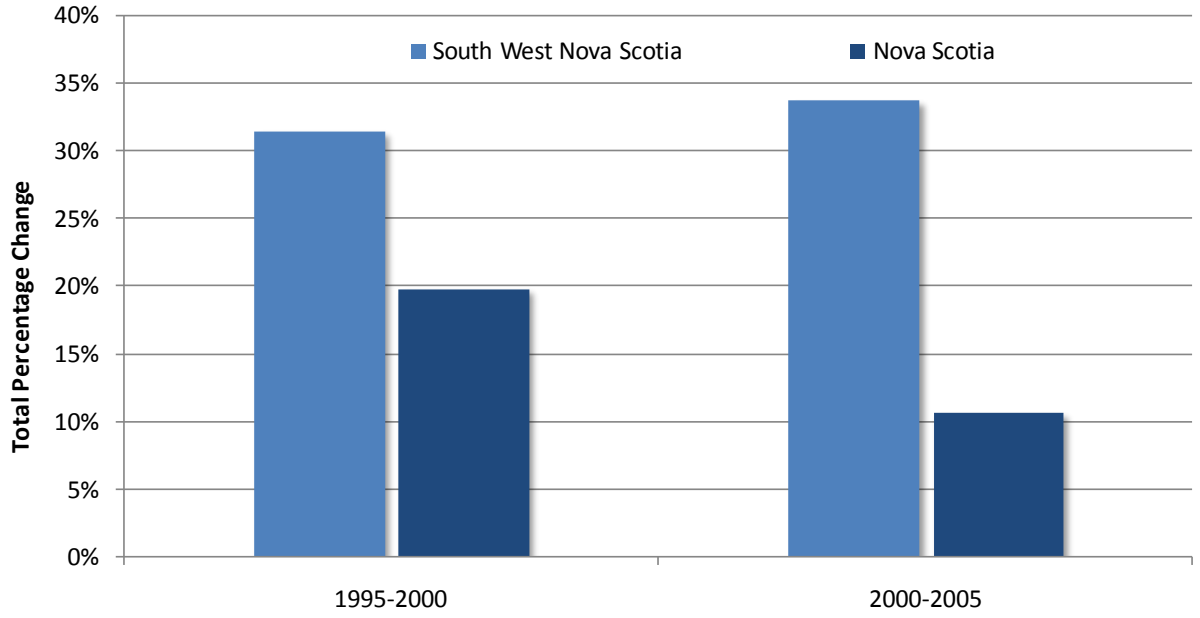
Since 1996 the number of farms in SWNS has declined, but gross farm receipts have increased (Figure 2-19 and Figure 2-20). In fact, gross farm receipts in SWNS have been growing at a much faster pace than in the province as a whole. From 1995 to 2000 gross farm receipts in SWNS grew 31.5 percent, compared to 19.8 percent in Nova Scotia. From 2000 to 2005, gross farm receipts in SWNS advanced by 33.7 percent relative to only 10.7 percent in the province.

Figure 2-19: Number of Farms, Counties of South West Nova Scotia, 1996-2006



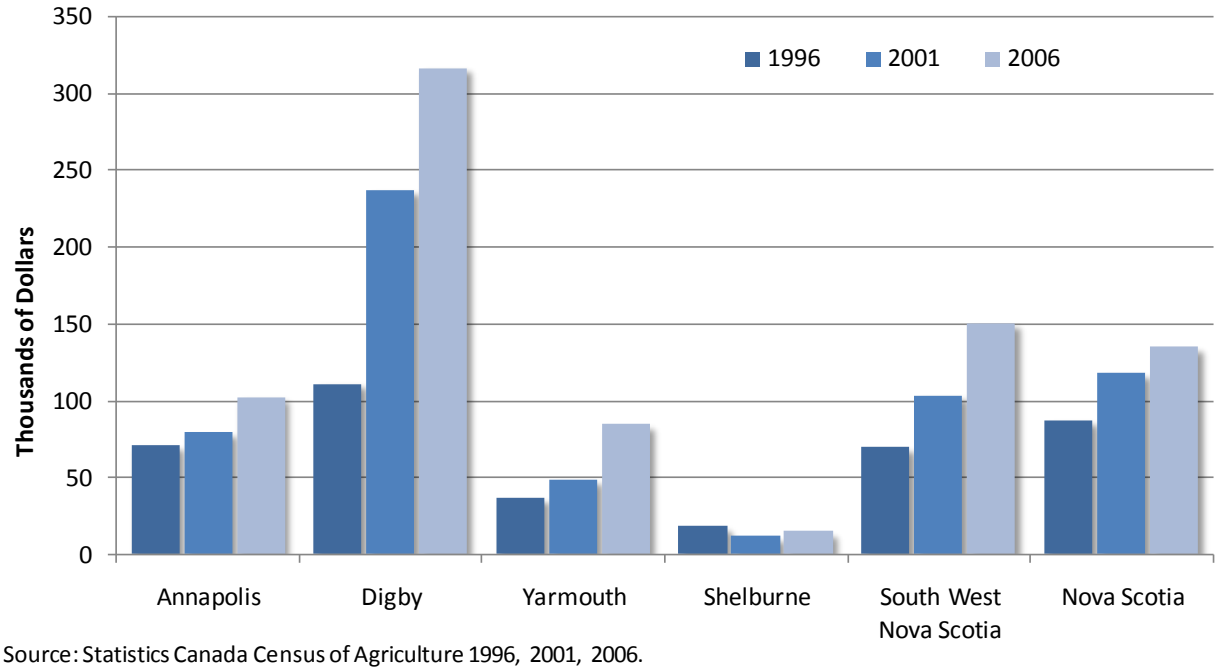
Source: Statistics Canada Census of Agriculture 1996, 2001, 2006.
Note: Includes Christmas tree only farms.

Figure 2-20: Growth in Gross Farm Receipts in South West Nova Scotia, 1995-2005



Source: CPCS analysis of data from Statistics Canada Census of Agriculture 1996, 2001, 2006.

Figure 2-21: Average Farm Receipts per Farm, 1996-2006



Source: Statistics Canada Census of Agriculture 1996, 2001, 2006.
Note: Includes Christmas tree only farms.

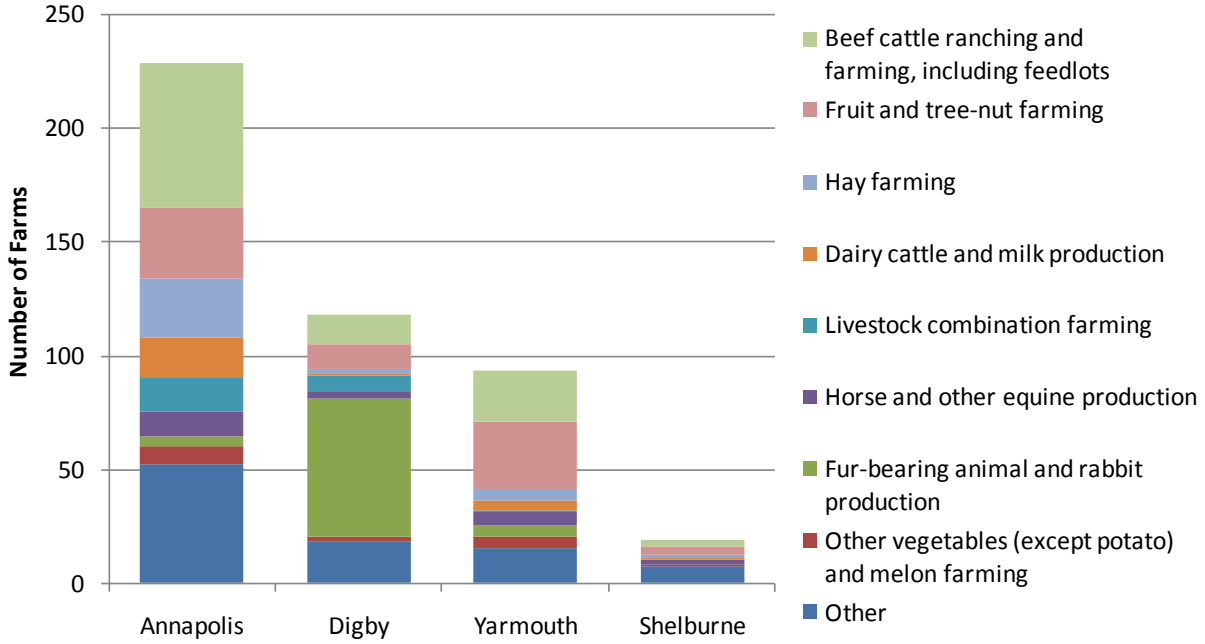
The average farm in SWNS in 2006 generated far more revenue than in 1996. Indeed, in 2006, the average farm in SWNS generated more revenue than the provincial average. However, SWNS's higher than average receipts per farm were entirely attributable to the exceptional performance of farms in Digby County, which had revenues almost two and a half times the

provincial average in 2006. Farms in the rest of SWNS were all considerably below the provincial average in terms of revenue, with the small number of farms in Shelburne County generating particularly weak revenues in 1996, 2001, and 2006.

Figure 2-22: Gross Farm Receipts (excluding forest products sold), South West Nova Scotia, 2005

Region	Number of Farms Reporting	Total Gross Farm Receipts ($)	Average Gross Farm Receipts ($)
Nova Scotia	3,795	509,520,691	134,261
South West Nova Scotia	458	68,563,158	149,701
Annapolis	228	23,246,116	101,957
Digby	118	37,236,807	315,566
Yarmouth	93	7,809,640	83,975
Shelburne	19	270,595	14,242

Figure 2-23: Number of Farms by Type, 2006[20]



Source: Statistics Canada Census of Agriculture 1996, 2001, 2006.

An important explanation for the strength of farming in Digby County is likely the high concentration of mink farms in the county. Indeed, one local newspaper referred to mink farming as the "backbone of the local economy."[21] Over half of all farms in Digby County are involved in this business, making agriculture in Digby County quite different from agriculture in the other counties of SWNS. Digby County contained 64 percent of all fur farms (mainly mink)

[20] The term "fur-bearing animal and rabbit production" is used by Statistics Canada, but mink is almost exclusively the animal raised in SWNS.
[21] Karla Kelly, "Backbone of local economy grew out of perseverance," *Digby Courier,* February 27, 2009.

in Nova Scotia in 2006. In recent years, mink demand has been particularly strong in Russia, China, and Turkey.

In Annapolis County, almost one-quarter of farms were involved in beef cattle ranching and farming and feedlots, with another quarter of the farms involved in fruit and tree nut farming or hay farming. In Yarmouth County, almost one-third of farms were in the fruit and tree nut farming business and almost one-quarter were in cattle ranching and feedlots.

2.2.3.3.1 Major Players

There do not appear to be any major players in this industry. Agriculture is dominated by smaller producers who make up the 458 farms in SWNS.

2.2.4 Mining

2.2.4.1 Overview

SWNS has mineral resources, including quartz, which could be exploited to provide income for the region. However, currently, only limited activity is underway. [22]

2.2.4.2 Industry Trends

The demand for quartz was adversely affected by the slump in US housing construction, since quartz is used in many building products including countertops, plaster for in-ground pools, and flooring.

2.2.4.3 Major Players

Black Bull Resources Inc., based in Shelburne, owns the White Rock mine. The mine produces a unique, bright, white, high-purity quartz, marketed under the Scotia White™ trademark which is used in a range of value-added, specialty products. The White Rock property also contains an identified resource of kaolin and mica.

The company is now focused on selling unprocessed ("damp") quartz stone and potentially kaolin clay produced at the quarry.

Black Bull has identified growth opportunities in the markets for quartz stone for the ferro silicon industry, low iron glass sand for the solar power industry, and kaolin clay for the paper industry. However, none of these opportunities has yet resulted in significant orders.

In 2008, Black Bull cited the slumping US housing market, the strong Canadian dollar, and increased freight costs as major challenges. In 2009, facing limited prospects, the company reported that it would enter a care and maintenance mode for the remainder of the economic downturn.

[22] Information in this section drawn from www.blackbullresources.com; the Black Bull Resources, Annual Report, 2008; and a presentation at Annual General Meeting, May 22, 2008.

2.2.5 Tourism

2.2.5.1 Overview

Tourism is important to the economy of SWNS, because it tends to peak in the summer months, while fishing activity is more significant in December and January, particularly for lobster.

2.2.5.2 Role of Tourism in Regional Economy

According to the Nova Scotia Department of Tourism Culture and Heritage, the tourism industry in SWNS generated revenues of $105 million in 2008 and supported the equivalent of 1,250 full-time jobs. Tourism-supported payroll in SWNS in 2008 was $41.2 million.

Figure 2-24: Economic Impact of Tourism by County, 2008

	Yarmouth	Shelburne	Digby	Annapolis	Total SWNS
Financials (millions of dollars)					
Revenues	$31.0	$13.8	$33.4	$27.1	$105.4
Federal Taxes	$1.9	$0.8	$2.0	$1.6	$6.3
Provincial Taxes	$2.3	$1.0	$2.5	$2.1	$7.9
Municipal Taxes	$0.5	$0.2	$0.6	$0.5	$1.8
Total Taxes	$4.8	$2.1	$5.1	$4.2	$16.2
Jobs					
Direct Jobs	500	200	600	500	1,800
Indirect Jobs	200	100	200	200	700
Total Jobs	700	300	800	600	2,400
Direct FTEs	300	100	300	200	900
Indirect FTEs	100	50	100	100	350
Total FTEs	400	100	400	300	1,250
Payroll (millions of dollars)					
Direct	$8.6	$3.8	$9.3	$7.6	$29.3
Indirect	$3.5	$1.6	$3.8	$3.1	$12.0
Total Payroll	$12.1	$5.4	$13.1	$10.6	$41.2

Source: Nova Scotia Department of Tourism, Culture and Heritage
Notes:
1. Due to rounding columns/rows may not add up to totals
2. FTE stands for Full Time Equivalent employee.

2.2.5.3 Industry Trends

Room sales for licensed tourist accommodation is a good indicator of tourism activity. From 2000 to 2008, room nights sold in SWNS fell 21 percent (Figure 2-25). The decline was most acute in Digby and Yarmouth counties (28 percent in both cases); Annapolis County saw a decline of 13 percent over the same period, while room sales in Shelburne County were up 3.0 percent, albeit on a smaller base. Up to July 2009, room nights sold were down slightly compared to 2008 for Yarmouth County and the Acadian Shore, but July 2009 showed improvement over July 2008.

Figure 2-25: Rooms Sold by County

County	2000	2008	Change
Annapolis	58,671	50,894	-13.3%
Digby	70,272	50,809	-27.7%
Yarmouth	83,851	60,654	-27.7%
Shelburne	24,064	24,680	2.6%
Total	**236,858**	**187,037**	**-21.0%**

Source: Nova Scotia Department of Tourism, Culture and Heritage

Between 2000 and 2008 tourism revenues in SWNS dropped from $113 million to $105 million. The biggest loss was in Yarmouth County, where revenues fell from $38.7 million to $31.0 million. In contrast, Shelburne County saw increased tourism revenues during this period from $11.0 million to $13.8 million.

In SWNS the number of licensed accommodations increased by 41 properties or 8 percent between the years 2000 and 2008, from 148 to 189 licensed accommodations over the eight year period. The majority of these properties were small bed and breakfast operations and this accounted for an increase of 160 units overall, from 1,992 units in 2000 to 2,152 in 2008. Yarmouth County experienced a net loss of five properties; Shelburne County increased by 23; Digby County by 20 and Annapolis County by three properties.

Many reasons are citied for the decline in tourism in SWNS since 2000. The terrorist attacks of September 11, 2001 changed the face of travel globally, and though tourism in this province was resilient to the immediate impact of 9/11, resulting changes in international air travel and security followed by the SARS scare of 2002 took its toll. Fuel prices, fluctuating exchange rates between Canada and the US and confusion and difficulties associated with passport issues in the US have all affected Nova Scotia's non-resident travel. There are also serious concerns surrounding the pricing and competitiveness of the Nova Scotia product, market-readiness in terms of a changing and more demanding customer, and transportation access to the province.

A 2006 travel trade study[23] offered interesting insights from tour operators that sell Nova Scotia products in New England. Sixty-five tour operators and 15 cruise representatives were interviewed. Highlights of interest from this study include:

- US entries to Atlantic Canada have fallen by 15.4 percent over the past five years
- 70 percent of the same tour operators who reported the decline in sales to Atlantic Canada reported gains in their US destination sales
- Tour operators identified high prices, the loss of the *Scotia Prince* ferry in 2005 and falling awareness of Atlantic Canada as the main reasons. Although the cross-over of customers to the cruise industry was not considered a leading factor in the decline by tour operators, further analysis shows the impact was likely underestimated
- 62 percent of companies described the Region as being overpriced. What was once Atlantic Canada's leading competitive advantage (price) has now become its greatest disadvantage.

[23] MacKellar, Cunningham & Associates, "Atlantic Canada Travel Trade Outlook Study", 2006.

The motorcoach sector is suffering throughout North America, and continues to falter in this region and in Nova Scotia. In 2007, motorcoach visitors to Nova Scotia fell by 26 percent; rebounded by 7 percent in 2008 only to fall again by 22 percent in 2009. That's a net loss of 19,000 visitors to Nova Scotia from 2008 to 2009.

The tourism industry in SWNS is "small by nature" and even large hotels have relatively modest revenues and marketing budgets.

2.2.5.4 Major Players

2.2.5.4.1 Bay Ferries

Bay Ferries is one of the most influential tourism operators in the region. It has a long-standing service between Digby and Saint John, NB (daily, year-round). Since the introduction of the *Cat* service in the mid-1990s (Yarmouth to Bar Harbor and Yarmouth to Portland) and the subsequent demise of the travel trade service offered by Prince of Fundy Cruises' *Scotia Prince*, Bay Ferries has influenced tourism in the region. Bay Ferries has partnered with the Province for marketing, partnered with operators on package development and in 2009 partnered with SWSDA in a packaging and marketing effort.

2.2.5.4.2 Rodd Inns and Resorts

Rodd Inns and Resorts is one of the largest hoteliers in Atlantic Canada, with a total of nine properties in PEI, New Brunswick and Nova Scotia. Rodd owns two properties in Yarmouth, the 138-room Grand Hotel and the 65-room Colony Harbour Inn. The company had an extensive packaging program with Prince of Fundy Cruises and has been engaged in similar programs with Bay Ferries.

2.2.5.4.3 Digby Pines

Along with the Keltic Lodge in Cape Breton and Liscombe Lodge on the Eastern Shore, the Digby Pines is one of three luxury resorts owned by the Province of Nova Scotia, and managed by New Castle Hotels and Resorts. The 147-room Digby Pines opened in 1929 and features a Stanley Thompson-designed golf course and a spa.

2.2.5.4.4 Kejimkujik National Park

Established in 1968, "Keji" is one of two National Parks in Nova Scotia and is located in SWNS. The park features 381 square kilometres of wilderness, and is located off Trunk 8, which traverses SWNS between Liverpool and Annapolis Royal. Keji has 91 km of trails and 320 unserviced camp sites. Keji has seen a decline visitation in recent years, from 49,000 in 2004 to 40,700 in 2008. From January to October 2009 Keji saw reduced visitation relative to the same period in 2008.[24]

2.2.6 Other Industries

Call centres have become significant employers in recent years in SWNS. Convergys in Cornwallis, Annapolis County, and Register.com in Yarmouth both employ large numbers of people and have an influence on local traffic patterns.

[24] Nova Scotia Department of Tourism, Culture and Heritage; 2009 Nova Scotia Tourism Indicators.

One interviewee familiar with the highway system in Annapolis noted the improved interchange on Highway 101 in Cornwallis to accommodate 500 workers at the nearby Convergys call centre.

A number of other enterprises were identified to the study team:

- A.F. Theriault and Sons shipyard in Clare employs 150 people.
- Acadian Seaplants is producer of seaweed extract fertilizers, kelp meal for feed supplements and soil amendments, edible sea vegetables, seaweed ingredients for food, health and beauty markets, and commercial brewing agents. Its Dr. James S. Craigie Research Center is located in Cornwallis, NS.
- Michelin operates tire manufacturing facilities in Bridgewater, Waterville and Granton, NS. None of the facilities is located within the study area, but Michelin is a potential customer for the Digby ferry.
- Terry Hawkins Industries, which is located in Shelburne, is a manufacturer of Fibre Glass Reinforced Polymer/Plastic (FRP) products for infrastructure, commercial and home use. The company operates a 10,000-sqft plant in the Shelburne Industrial Park.
- Tri-Star Industries Limited is based in Yarmouth. Tri-Star is a leading manufacturer of ambulances and other specialty vehicles. Since 1979, the company has been exporting to over 40 countries. Tri-Star manufacturers out of a 60,000-square-foot facility, where it undertakes not only assembly, but also design, engineering, testing, electronic systems, and graphics.
- Ven-Rez is located in Shelburne and a member of the Shaw Group of Companies. Ven-Rez manufactures school, institutional, and library furniture. The 120,000-sqft facility in Shelburne supplies markets in North America, Africa and the West Indies.

3 Analysis of Trade Flows and Traffic Patterns

3.1 Current Flows and Stakeholder Issues

This chapter presents current traffic flows in SWNS and forecast traffic flows for the next 10 years.

3.1.1 Fish and Fish Processing

Overall, in 2006,[25] Nova Scotia exported 152,000 tonnes of fish and seafood worth an estimated $974 million.[26] By value, an estimated 60 percent of Nova Scotia's seafood exports are produced in SWNS. Overall, SWNS produces around 150,000 tonnes of fish and seafood

Of approximately $1 billion in seafood exports from the province as a whole in 2005, approximately $600 million was shipped by road, $300 million by water (container shipping) and $125 million by air. About one-half was exported to the US, of which 50 percent goes to Maine or Massachusetts, but much of this is then re-exported. Seafood shipments move to market in 53' refrigerated trailers which typically hold 35,000 to 40,000 lbs (15 to 18 tonnes) of live or fresh product. Data are not available on how fish and seafood from SWNS in particular are processed and shipped to final market destinations.

In terms of modes used, seafood product is currently exported by truck to markets in the United States, the Maritimes, and central Canada. Product is exported by air all over the world. Limited live air cargo capacity in Halifax has meant that an overwhelming proportion of these shipments (85 percent) must first be trucked to other Canadian (Montreal, Toronto) and American (Boston, New York) airports[27] for shipment to Europe or Asia. A new multi-tenant air cargo facility at HIAA is expected to address this situation, which is also affected by current "Open Skies" negotiations between Canada and various countries including the EU. While the demand for air transportation out of SWNS is no doubt strong, the supply is constrained by market and regulatory barriers.

As a 2007 report by Gardner Pinfold stated,

> With an estimated 95% of seafood production exported from the province, reliable and efficient transportation modes (air, road and sea) are vital to the success of the industry. More specifically, with about 70% of the value of exports destined to the US, most of it in live or fresh form, the industry relies critically on efficient transportation infrastructure to key US markets. Nova Scotia benefits from its close proximity to its largest market, and a good road (and ferry) network between Nova Scotia and the US northeast allows truck delivery to Boston and New York

[25] The latest year for which data were available from Nova Scotia Fish and Aquaculture.
[26] Statistics Canada.
[27] Gardner Pinfold, "Nova Scotia Seafood Processing Sector: State of the Industry and Competitiveness Assessment" for Nova Scotia Department of Fisheries and Aquaculture, 2007.

in 12-18 hours. The ferry between Digby and Saint John represents an important link in this network for plants in southwest Nova Scotia.[28]

The latest information provided by Bay Ferries suggests that around 75 percent of commercial vehicle traffic on the Digby-Saint John ferry is fishery-related.

Consultations with stakeholders revealed that transportation costs are secondary to the quality and reliability of transportation. Given that fish production in the region is now primarily focused on exports of live and fresh groundfish and shellfish, speed, quality (including quality of handling) and reliability of transport are the principal concerns. The highest prices can be achieved by providing higher quality with higher reliability to niche markets, especially in the US northeast. Ferry service, particularly the Digby-Saint John service, is viewed by the industry as being a critical link in the supply chain and essential for accessing US and overseas markets.

3.1.2 Forest Products

Forestry in SWNS involves a number of traffic flows, all of which occur by truck:

- Logs are transported from logging sites to sawmills.
- Wood chips are transported from sawmills and logging sites to Bowater Mersey in Brooklyn and the Brooklyn Power Corporation, which uses wood chips as fuel.
- Lumber is transported from sawmills to local industries and retailers.

The largest flow is the shipment of logs and wood chips to Bowater Mersey, the Brooklyn Power Corporation, and the Oakhill Sawmill; all three establishments are located outside the study area, in Queens County. When the Bowater Mersey plant is operating at full capacity, this product flow accounts for approximately 500,000 tonnes per year. Material drawn from SWNS is primary sourced from Yarmouth County, with Digby and Annapolis counties also supplying amounts of fibre. Shelburne is not an important source of this flow.

Using an estimate of 31 tonnes per truckload, this flow represents approximately 16,000 truckloads of fibre per year. Woodchips are often transported in a B-train long-combination vehicle.[29]

The key transportation issue associated with the forest products industry in SWNS is the spring-time weight restrictions on collector highways and local roads. Trunk highways (8 and 10) and 100-Series highways are not problematic. Because weight restrictions reduce the capacity of trucks carrying fibre, Bowater Mersey is required to build up inventories mid February to May, which drives up costs.

3.1.3 Agriculture

Agricultural operators use trucks to bring fertilizer, feedstocks, and equipment to farms from farm suppliers and feed mills. Farm products are then trucked out to end markets.

[28] Ibid.
[29] A significant volume of wood chips and pulp wood moved across the Bay of Fundy by ferry from Nova Scotia to New Brunswick until two or three years ago. However, the Irving Group now sources this product closer to its plants in New Brunswick.

Mink farming is a particularly important type of farming in SWNS. Since mink consume animal products, mink farms require fish, chicken, and other animal waste products as a key input to production. These products are sourced locally and from as far away as the US eastern seaboard and Ontario. Locally, for instance, much fish waste from plants in SWNS is processed at Nova Feeds Ltd. in Meteghan, Digby County. Further afield, the rise of mink farming has provided truckers hauling seafood from SWNS to the United States and central Canada with a profitable backhaul cargo. In some cases, truckers travel back to SWNS via Montreal and use the Saint John–Digby ferry in the process. For instance, chicken parts are imported from Quebec and herring is often imported from New England for mink feed.

Mink farming equipment can be highly specialized and is often imported from Europe. These cargoes are transported by container through the Port of Halifax, or by air through Halifax airport for more time-sensitive cargoes, and over road to SWNS. Other farm equipment is trucked in from Ontario.

Furs are dried and dressed locally, including at a cooperative pelting plant in Weymouth. Furs are then are exported by truck to Toronto, one of two major fur auction centres in North America. This traffic takes place over four or five months in the fall when the furs are ready.

Many farmers own their own trucks and the industry is composed of many small, and a handful of larger, producers. Each mink consumes about 100 lbs of feed per year and the SWNS region currently produces about 1.5 million pelts. This translates into about 3,400 truck loads per year.

3.1.4 Mining

Black Bull Resources (operations described in Section 2.2.4) has recently used a combination of truck and rail to access the New Brunswick market, with product trucked to Truro where it is loaded on railcars.

Key issues include the high costs of back-haul trucking, repositioning of empty containers, and trucking in general. At present the company does not consider the port of Shelburne to be suitable for the export of its product, because of what it considers to be inadequate infrastructure. (It should be pointed out that Shelburne has handled containers in the past for Clearwater Seafoods.)

Black Bull Resources has noted in annual reports that high transportation costs prevent it from entering the potentially attractive market for low iron glass sand used for flat glass in solar panel manufacturing.

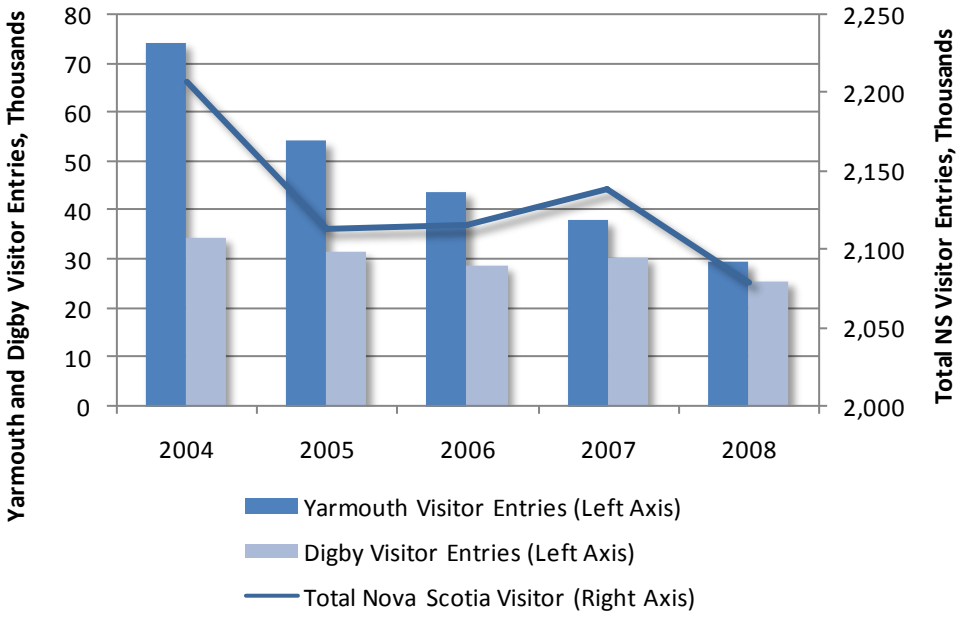
3.1.5 Manufacturing

SWNS has a number of manufacturers who use the transportation system to export their products. Data are not sufficient to gauge the volume of traffic generated by manufacturers, but it is certainly smaller than the traffic volumes generated by the fishery, forestry, and tourism. All manufacturing shipments out of the region occur by road or ferry.

3.1.6 Tourism

As was noted above, tourism has been in decline in SWNS since 2004. A look at visitors by entry point, illustrates this trend (Figure 3-1).

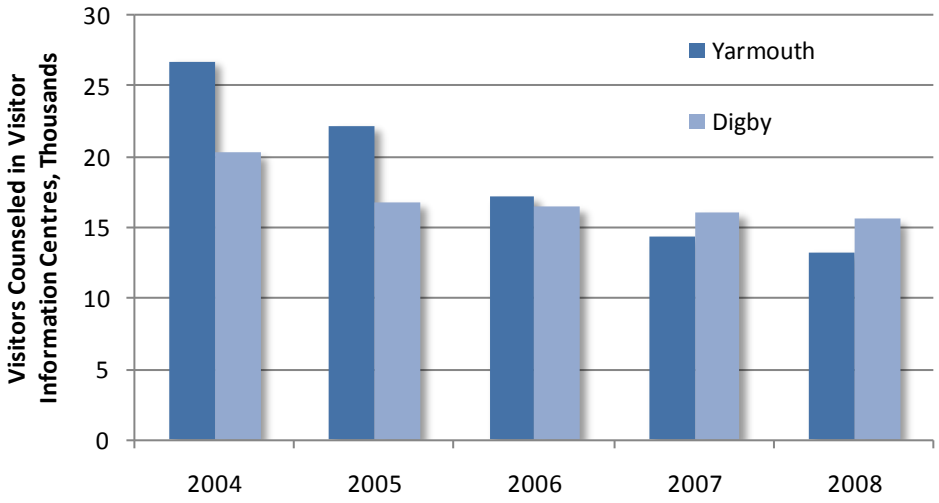
Figure 3-1: Visitors by SWNS Entry Point and Overall Nova Scotia Visitation, 2004-08



Source: CPCS analysis of data from Nova Scotia Tourism and Culture, Research and Statistics

Activity at visitor information centres (VICs) is another indicator of visitor activity. For the past decade the number of people counselled at visitor information centres has decreased, influenced to some extent by an increase in use of the internet as an information travel tool. In 2004, 86,300 visitors were counselled at provincial and local VICs in the four counties of southwest Nova Scotia, while 47,900 visitors were counselled at VICs in the four counties in 2008, a decline of 45 percent. To put these figures in context, across Nova Scotia as a whole, 563,000 visitors were counselled in VICs in 2008, down 14 percent from the 654,000 visitors counselled in VICs in 2005. This is illustrated below:

Figure 3-2: Visitors Counselled in Visitor Information Centres, Digby and Yarmouth, 2004-2008

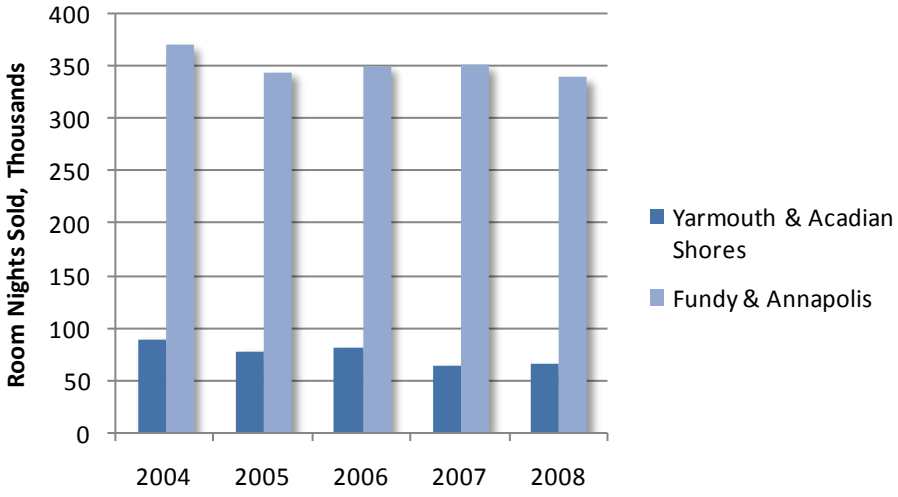


Source: CPCS analysis of data from Nova Scotia Tourism and Culture, Research and Statistics

Another important aspect of tourism in SWNS is its dramatic seasonality. In the Yarmouth and Acadian Shores region in 2009, room nights sold peaked in July/August/September at an average of 9,400 room nights per month. In January of 2009 3,000 room nights were sold. This seasonality pattern has remained constant over the past three years. A total of approximately 66,000 room nights were sold in the region in 2008, up from 63,000 in 2007.

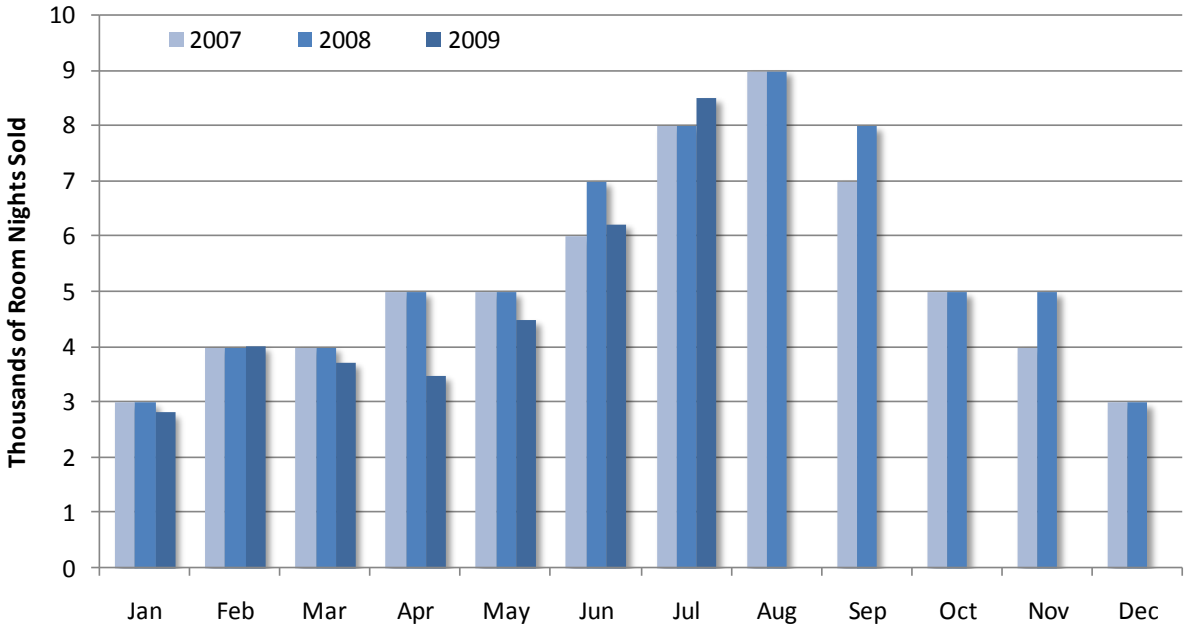
The figure below shows changes in accommodation demand in two pertinent regions, for the years 2004-2008.

Figure 3-3: Accommodation Demand, Room Nights Sold, 2004-2008



Source: CPCS analysis of data from Nova Scotia Tourism and Culture, Research and Statistics

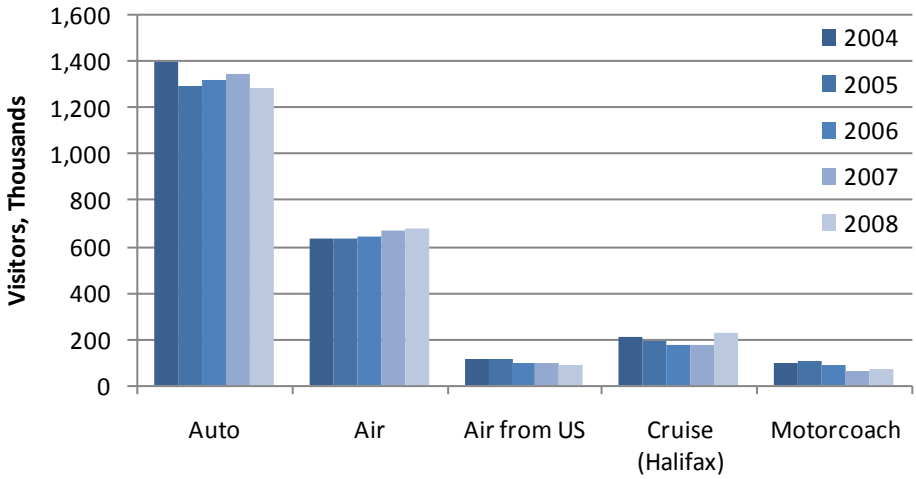
Figure 3-4: The Seasonal Pattern of Tourism, Yarmouth and Acadian Shore, 2007-2009



Source: CPCS analysis of data from Nova Scotia Tourism, Culture, and Heritage.

Almost 60 percent of non-resident traffic to Nova Scotia arrives by auto, motor coach or recreational vehicle (RV). Since 2004, auto traffic has declined, air travel has increased, cruise visitation to Halifax has increased, and motorcoach has declined, as illustrated below:

Figure 3-5: Visitors to Nova Scotia by Mode of Arrival, 2004-2008

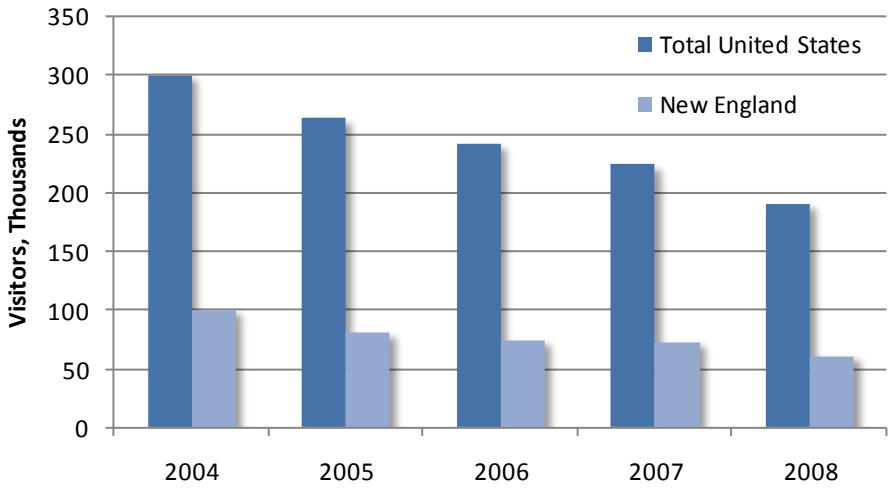


Source: CPCS analysis of data from Nova Scotia Tourism and Culture, Research and Statistics

Traditionally, on average, one-half of visitors to Nova Scotia come from Atlantic Canada, followed by Ontario, the United States and other Canadian provinces including Quebec.

The overall US and New England market has been in decline since at least 2004, as shown below:

Figure 3-6: Overall US and New England Visitors to Nova Scotia, 2004-2008



Source: CPCS analysis of data from Nova Scotia Tourism and Culture, Research and Statistics

Thirty-seven percent (37%) of non-resident visitors to Nova Scotia traveled to and through the South Shore (including Shelburne and Yarmouth Counties and municipalities of Clare and Argyle). They were from (in order of volume) Atlantic Canada, Ontario, the US outside New England and New England, and they were primarily traveling for leisure purposes.

Thirty-three percent (33%) of non-resident visitors to Nova Scotia traveled to and through the Annapolis Valley (including Digby and Annapolis Counties). They were in order of volume from Atlantic Canada, the US outside New England, New England and Ontario.

Most recently, the *2009 Yarmouth and Acadian Shores Destination Development Study*[30] indicates that between 2004 and 2008 non-resident day-trip and overnight visitation to the area fell by 27 percent to 38 percent, or an average of 33 percent. The study also estimates that non-resident visitation in 2004 was 176,600, and by 2008 it had fallen to between 128,800 and 109,600.

Almost two million overnight trips were taken by residents within the province in 2006.[31] Nova Scotians also made 4.5 million day trips within the province in 2006. The Annapolis Valley, the

[30] The Tourism Company, "Filling the Chairs: "Tourism Destination Development Plan for Yarmouth and Acadian Shores: Final Report", 2009.
[31] NS Tourism and Culture, "In-Province Travel by Nova Scotians", 2006.

Northumberland Shore including Truro, and the Halifax Regional Municipality are the top areas of interest for residents of the province.

Figure 3-7 shows the major origins of visitors to the South Shore and the Annapolis Valley in 2004. Visitors to the region are primarily from Atlantic Canada, Ontario, and areas of the US outside of New England.

Figure 3-7: Number of Visitor "Parties", 2004

Market	South Shore		Annapolis Valley	
	Visitors	% visitation	Visitors	% visitation
Atlantic Canada	50,398	26.3	54,227	31.4
Ontario	47,210	24.7	35,861	20.8
Other US	42,383	22.1	35,181	20.4
Other Canada	21,487	11.3	17,595	10.2
Quebec	10,519	5.5	11,114	6.4
International	10,294	5.3	9,843	5.7
New England	9,071	4.8	8,693	5.1
Total	191,363		172,515	

Source: Visitor Exit Survey, NS Tourism & Culture, 2004

The average size of visitor parties to the South Shore region was 2.3 people, while the average party size in the Annapolis Valley was 2.2 people. Party size varied according to the origin of the travelling party. It should also be noted that a portion of these people visited both regions on their trip.

Transportation infrastructure supports the tourism industry in SWNS by making access to the region cheaper, faster, more reliable, and more entertaining. The better these four objectives can be realized, the greater the benefit to tourism in SWNS.

3.1.7 Population Gravity Traffic

There is also traffic generated by the need to provide the goods and services to the residents of SWNS. This type of traffic includes construction materials, groceries, hardware, and other goods used on a regular basis. This traffic will vary with population and to some extent with income. All else being equal, the traffic between larger centres will be larger than the traffic between smaller centres, hence the name "gravity" traffic. This is illustrated by the emergence of Yarmouth as a regional service centre.

Throughout rural Canada the last 20 years have seen the increasing development of regional service centres, which bring together retailers and services in larger centres. This phenomenon has been driven in part by the economies of scale that can be gained in big-box retailing.

In SWNS, Yarmouth, and to a lesser extent Digby, have developed as regional service centres. The towns have seen major investment by large retailers in big-box stores including the Nova Scotia Liquor Corporation, Sobeys, Loblaws (Atlantic Superstore), Home Hardware, Wal-Mart, and Canadian Tire.

This trend means that more truck traffic will move directly to Yarmouth from distribution centres in Halifax and Moncton, with less traffic to smaller communities. For passenger traffic, shoppers will tend to drive further to access the big box stores. In spite of rising fuel prices, shoppers are generally willing to do this because of better quality roads, and because of the lower prices, higher quality, and larger selection of products and services offered in a regional service centre.

Retail on Starrs Road, Yarmouth

Source: CPCS

3.2 Forecast of Traffic Flows 2010-2019

Based on the regional socio-economic analysis above, other economic information, and input from key industry stakeholders, this chapter provides a forecast of traffic through SWNS over the next 10 years (up to 2019).

3.2.1 Fishery and Fish Processing

Traffic flows generated by the fish and fish processing industries will depend on the health of the fishery, demand conditions in key markets, and the development of aquaculture.

3.2.1.1 Health of the Fishery

According to fish processors, fish quotas for many types of species are at historic highs. For instance, lobster is at a 100-year peak, and haddock is at a 50-year peak. Herring, on the other hand is at a 50-year low. Scallops stocks are relatively healthy and stable. In spite of efforts to rebuild cod stocks, this fishery has not recovered. Over the next 10 years, the fish processors do not expect large growth in volume. Instead they are focused on obtaining better prices.

3.2.1.2 Demand Conditions

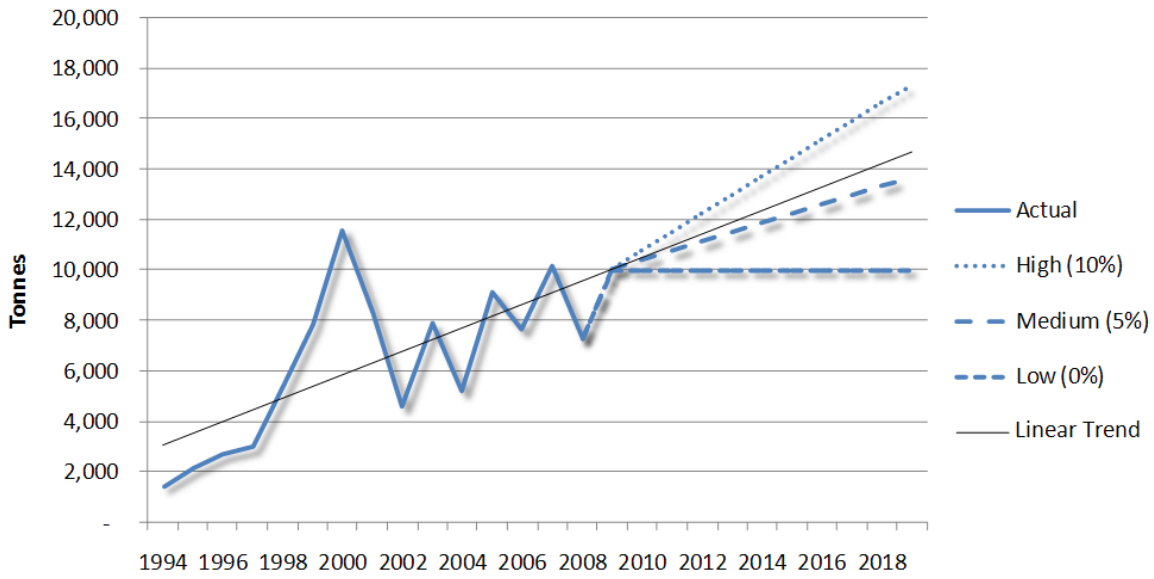
Demand for seafood can be expected to continue a steady increase as global average incomes rise. Should the Canadian Dollar continue to rise, demand in some markets, particularly the United States, will be adversely affected.

3.2.1.3 The Development of Aquaculture

Aquaculture in Nova Scotia has seen rapid development over the past 15 years, but production volumes remain small relative to the traditional fishery.

Figure 3-8 presents a forecast of aquaculture production based on projected growth rates. A linear trend based on actual data from the period 1994-2008 is also included for reference. Given the volatility of aquaculture production, prediction is difficult. The forecast assumes a return to trend production in 2009. From that starting point low (no growth), medium (5.0 percent average growth, not compounded), and high (10.0 percent average growth, not compounded) are projected. While 5.0 percent average (not compounded) growth is below trend, this growth does incorporate some prudence in the event production does not return to trend in 2009.

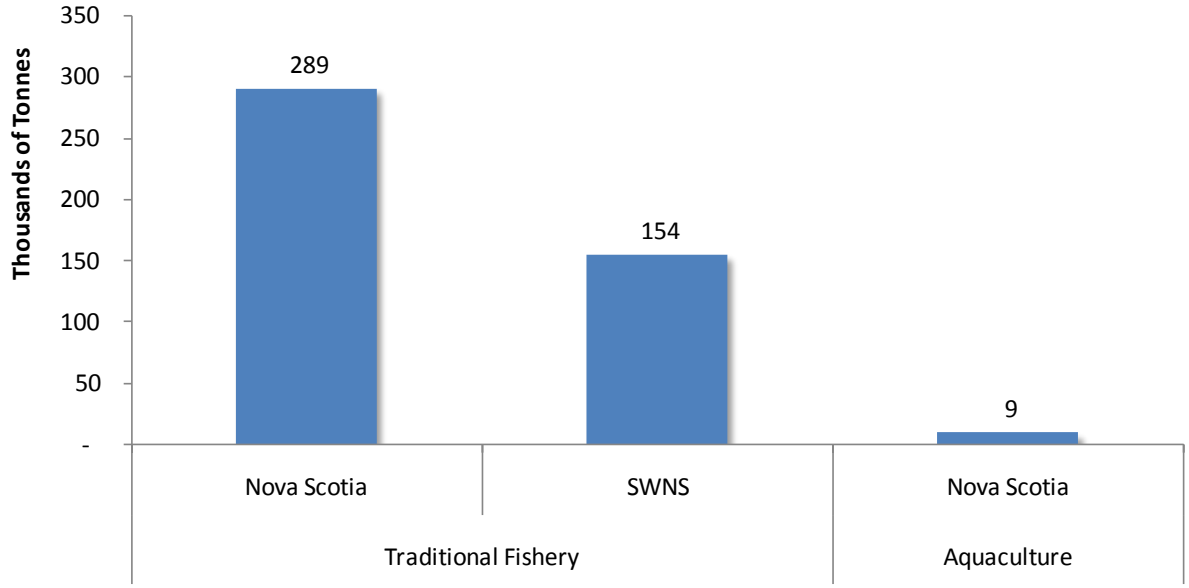
Figure 3-8: Forecast of Aquaculture Production in Nova Scotia



Source: Actual data from Nova Scotia Fisheries and Aquaculture, forecast by CPCS

These estimates are for all of Nova Scotia, and SWNS produces only a portion of Nova Scotia's aquaculture output. Given the small volume of traffic generated by aquaculture relative to the traditional fishery (Figure 3-9), even if aquaculture experienced rapid growth in tonnage, it would not become a major source of traffic in SWNS over the next 10 years.

Figure 3-9: Relative Production, Traditional Fishery and Aquaculture, 2005

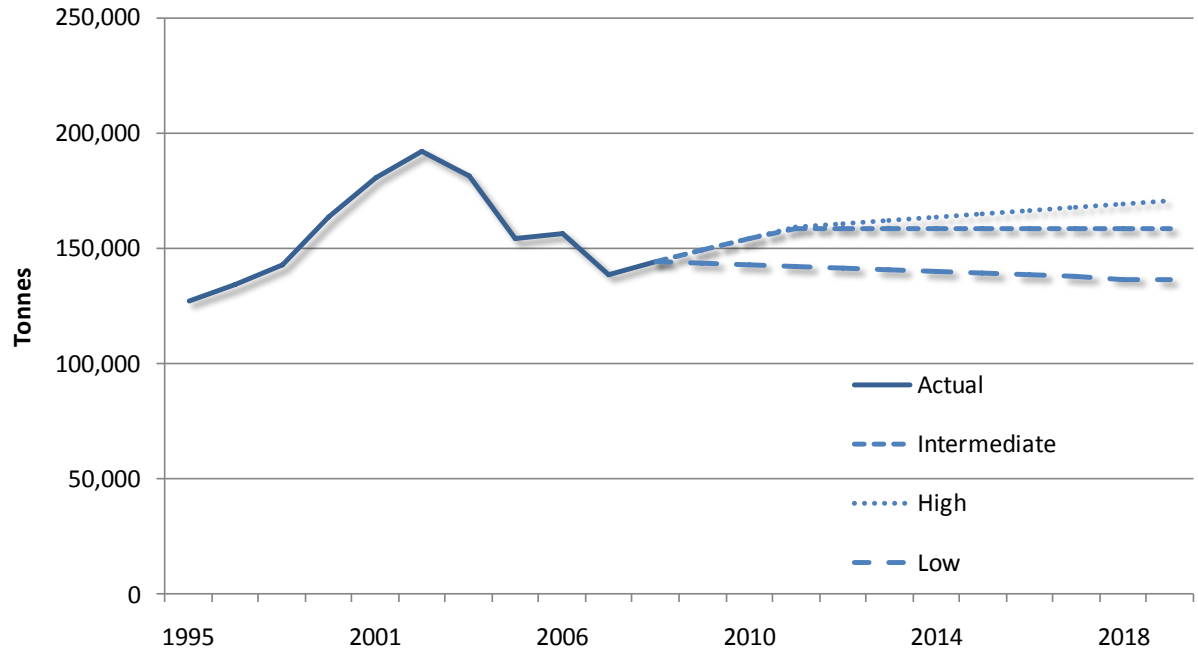


Source: Actual data from Nova Scotia Fisheries and Aquaculture, forecast by CPCS

3.2.1.4 Overall Forecast

Figure 3-10 provides a forecast for the SWNS fishery, not including aquaculture.

Figure 3-10: Overall Fishery Forecast (Excluding Aquaculture), 1995-2019



The most likely scenario is for a return to the average harvest levels of the 10 years from 1997 to 2008 by 2011, with no further growth in the volume of fish products produced in SWNS. The optimistic scenario is that production of traditionally caught fish increase to the average 1997-

2008 level by 2011, then increase slowly by 1.0 percent per year (not compounded). The pessimistic scenario assumes that the traditional fishery does not recover, but rather peaks in 2008, then declines by 0.5 percent per year (not compounded).

3.2.2 Forestry

Forestry traffic flows over the next 10 years will depend greatly on the health of the market for lumber and on the demand for wood chips from Bowater Mersey in Brooklyn.

On the supply side, a recent report from the Atlantic Provinces Economic Council cites a number of institutional factors as hindering the growth of the forest products industry in Atlantic Canada:

> The small scale of sawmills in Atlantic Canada is due to many factors. Long-standing agreements on the distribution of the wood supply and a declining wood supply across the region have meant that individual mills in Atlantic Canada have considerable difficulty in gaining access to an increased volume of fibre. In contrast, sawmills in British Columbia have benefited from dedicated access to Crown land. A similar constraint exists for pulp mills, given the licensing arrangements attached to these mills in Newfoundland and Labrador and in New Brunswick. In the primary forestry, the high proportion of private lands and a large number of small private woodlot owners have contributed to a large number of logging contractors.
>
> A similar trend is occurring in the wood products industry where large sawmills can deliver substantial productivity gains. New mills in Europe and western North America are now averaging capacity of close to 600 million foot board measure (MMfbm), well above Atlantic Canada's largest sawmill which has a capacity of 212 MMfbm, which recently closed. British Columbia-based Canfor currently operates 14 sawmills that are bigger than the largest mill in Atlantic Canada. [32]

In a world of economies and scale, small mills are increasingly unable to compete. A combination of industry consolidation and lower transportation costs for product sourced on the other side of the Bay of Fundy are seriously undermining the viability of forestry in SWNS.

Competition from abroad is also having an impact. International forest products companies are looking to locate production where labour and fibre sources are cheap and plentiful. Massive new mills that take full advantage of the large economies of scale in the paper manufacturing industry, for example, are now competing with Canada's older and smaller plants. Small mills serving only a local market could be the future of forestry in SWNS.

Wood fibre is the single largest input cost for many segments of the forest sector, accounting for more than half of variable production costs for some products, and as much as 3/4 of operating costs at some sawmills, according to the Forest Products Association of Canada (FPAC).

At the same time that competition is increasing, the rise of electronic media is significantly reducing the demand for newsprint, leaving producers fighting for a share of a shrinking market.

[32] Atlantic Provinces Economic Council, "Building Competitiveness in Atlantic Canada's Forest Industries: A Strategy for Future Prosperity", APEC Forum on Competitiveness, August, 2008.

While a rebound in the US housing market could provide an opportunity for wood product manufacturers and loggers, given that the four largest sawmills in SWNS have all closed since 2000, the opportunity for SWNS to take advantage of this opportunity is questionable. Overall, it seems unlikely that forestry will drive an increase in traffic volumes in the long run. It is likely there will be some rebound in traffic as the economy in general, and the US housing market in particular, recovers in 2010 and 2011. However, this recovery will be subdued by the fact that much of the capacity to produce wood products in SWNS has been closed permanently over the past 10 years.

3.2.3 Agriculture

Mink farming has seen explosive growth in the past, with the number of pelts produced in Nova Scotia rising from 103,135 in 1972 to 722,600 in 2003, average annual growth of 6.5 percent.[33] Insufficient data were available to estimate the level of transportation demand associated with agriculture.

At the level of detail that is relevant to this study, agricultural traffic should be expected to stay roughly constant over the next ten years.

3.2.4 Mining

Only two mining operations in SWNS have been identified. Traffic related to mining relates to the prospects for Black Bull Resources and for the East Kemptville tin mine.

While there is a potential demand for transportation from Black Bull Resources to ship quartz from its White Rock property located on Route 203 between Yarmouth and Shelburne, it seems that a significant demand will not materialize until the North American economy recovers from recession. Black Bull has indicated that it would like to ship via the port of Shelburne in containers, but cannot given the present state of infrastructure in that port. It is not clear, either, whether quartz *can* be shipped in containers.

A number of individuals indicated there has been recent speculation that the East Kemptville tin mine could be redeveloped and reopen, given the world price of tin. Previously, it had shipped concentrate to Halifax for ultimate refining overseas.

In neither case is mining likely to generate significant traffic in the next 10 years.

[33] Canmac Economics Ltd., "Economic Impact Study of the Mink Enterprise Industry", December 2004.

3.2.5 Manufacturing

There are currently no plans to significantly expand manufacturing in SWNS. At the level of detail that is important for this study, traffic should be expected to stay roughly constant over the next 10 years.

3.2.6 Tourism

Since the 2007 Opus study[34], a number of issues continue to impact the tourist industry in Nova Scotia, and SWNS in particular. These include:

- General state of the Canadian and US economies
- The boom in cruise tourism
- Canada-US dollar exchange rate
- Border security and passport issues
- Marketing and competition from a wide variety of other destinations

3.2.6.1 General State of Canadian and US Economies

Based on the available data on the origin of tourists to SWNS, we know that around 95 percent of tourists are from Canada and the United States (See Section 3.1.6, p. 54). For this reason, even significant growth in tourist traffic from outside this market is unlikely to have a large impact on total tourism in the next 10 years. Our projection of tourist traffic in SWNS focuses on the Canadian and US markets.

After sharp declines in economic activity (measured by percentage change in real GDP) in 2009, forecasters expect economic activity to rebound in 2010 and growth in Canada, and particular in the United States to be fairly strong in 2012 and 2013 (Figure 3-11). The forecasters see more moderate growth in 2014. The US Congressional Budget Office budget further predicts economic growth to be stable at 2.5 percent per year from 2014 to 2019.

While the Canadian Parliamentary Budget Office does not project growth past 2014, we assume that Canada will exhibit a similar pattern, with growth stable at 2.7 percent per year in 2014 and after.

3.2.6.2 Canada-US Dollar Exchange Rate

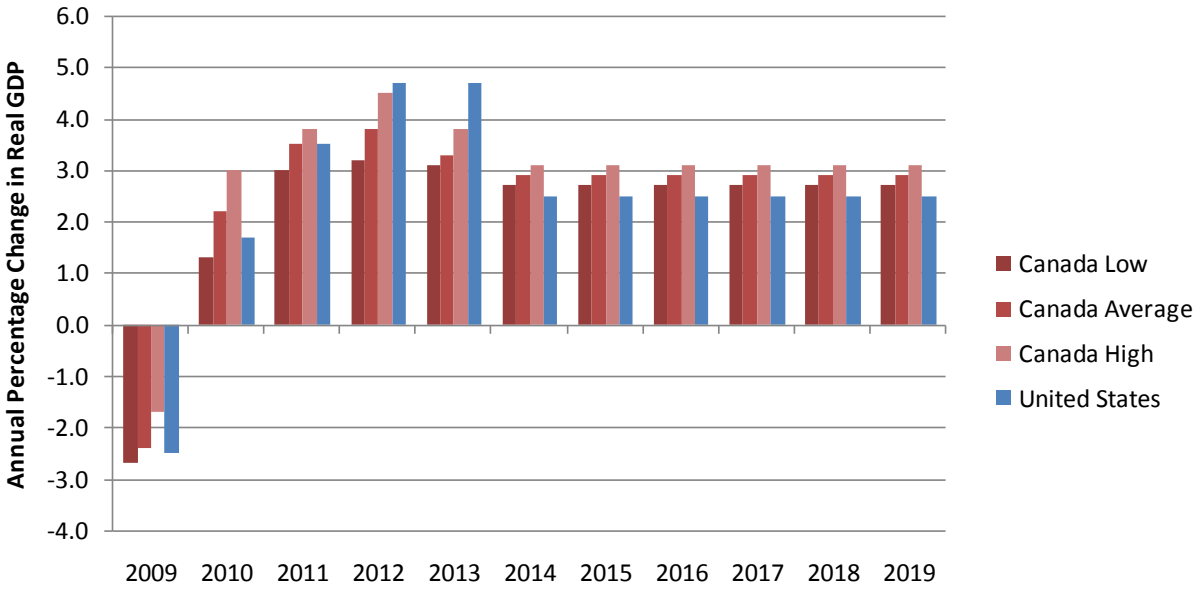
As tourism operators know all too well, when the Canadian dollar rises in terms of the US dollar and other foreign currencies, tourists find visiting SWNS more expensive. Predicting the course of the Canada-US dollar exchange rate is no easy task, especially over a period of 10 years.

Two factors will probably be most important. One is the long-term decline in value of the US dollar relative to many other currencies reflecting high levels of indebtedness in the United States household and government sectors. Another important trend for Canada will be the future path of energy prices, which have a strong influence on the Canada-US dollar exchange rate because Canada exports so much energy to the United States.

[34] Opus International Consultants (Canada), "Digby-Saint John Ferry Service Traffic and Socio-Economic Analyses", Transport Canada, 2007.

It seems likely that in the longer term, the Canadian dollar will rise against the US dollar. As a result, tourism from the United States to SWNS will be adversely affected.

Figure 3-11: Project Real GDP Growth, Canada and the United States, 2009-2019



Source: Canada: 2009-2014 Parliamentary Budget Office Private Sector Economic Survey; 2015-2019 assumed equal to 2014. USA: Congressional Budget Office

3.2.6.3 The Boom in Cruise Tourism

Cruise and air-related tourism are growing rapidly at the expense of auto and motor coach tourism. According to the Cruise Line Industry Association, the cruise industry is the fastest growth category in the leisure travel market with an average rate of growth of 7.4 percent annually since 1990. In 2009, ports in the Atlantic region handled some 600,000 passengers, including 215,000 at Halifax, 190,000 in Saint John, 60,000 in Sydney and another 60,000 in Charlottetown.

Ports in SWNS are in varying states of readiness to accept cruise traffic. Digby is not participating in the Small Ports Program but is marketing to the cruise industry on its own. In October 2009 Digby hosted a transatlantic cruise ship, the *Balmoral* out of the UK with 1,200 people onboard. There is some concern that the infrastructure does not exist in Digby to maximize this opportunity. Yarmouth is not pursuing cruise business due to the *Cat* service, complications with the tides and the entry to the port. Shelburne has expressed its intent to participate in the market-readiness workshop offered.

The cruise industry, with its vessels which cost more than $500-million to construct, is growing at the expense of the traditional group/motor coach business. As the traditional motor coach market is replaced by healthy and active baby boomers, the mode of travel is changing to cruise. Boomers want to sample, experience and participate in new destinations and activities – and they lime the convenience of unpacking once. A cruise is also suitable for multi-generational travel, which is growing.

To the extent that rising fuel prices will tend to outpace efficiency improvements in cars, the effect could be to discourage long-distance driving and encourage cruise and air holidays. Driving, including a ferry crossing, is the key means to accessing SWNS. For example, in 2000, 75 percent of visits to the province were by road, whereas by 2008, 67 percent arrived by road. US visitation by road declined from 72 percent to 54 percent in the same period. Atlantic Canadian visitation held steady at between 92 to 94 percent by road, while Quebec declined from 62 to 56 percent and Ontario dropped from 55 to 43 percent by road.[35] This decline is partly attributable to higher fuel prices and tighter border security requirements, in the case of visitors from the United States, but the decline is a long term trend going back to the 1970s. Between 2000 and 2008, there was a 24-percent increase in the number of visitors arriving in Nova Scotia by air, a 38-percent decline in visitors arriving via Digby and 67-percent decline in those arriving by ferry via Yarmouth.

3.2.6.4 Border Security and Passport Issues

For US visitors to Canada, recent changes that require American citizens to obtain a passport for re-entry to the United States will adversely affect tourism. Over time, these effects may ease somewhat, but for many Americans, obtaining a passport will not be worth the effort. It is not yet clear whether the effect of these restrictions on tourism are likely to be a one-time phenomenon or a permanent, downward shift in tourism from the United States.

3.2.6.5 Tourism Marketing

Bay Ferries has had an aggressive marketing and sales program for the *Cat*, which promoted "One of the World's Super Ships – two of the World's Top Destinations". The company advertised in most regional guide books, and worked with hotel operators on both the Canadian and US sides of the Bay to package vacations. A new marketing partnership with Yarmouth and Acadian Shores was announced in February 2009, which includes a new web site. The company had a day cruise program from Bar Harbor and a program with the Atlantic Canada Tourism Partnership (ACTP), which contributed funds to develop and build markets in the US.

3.2.6.6 Overall Tourism Forecast

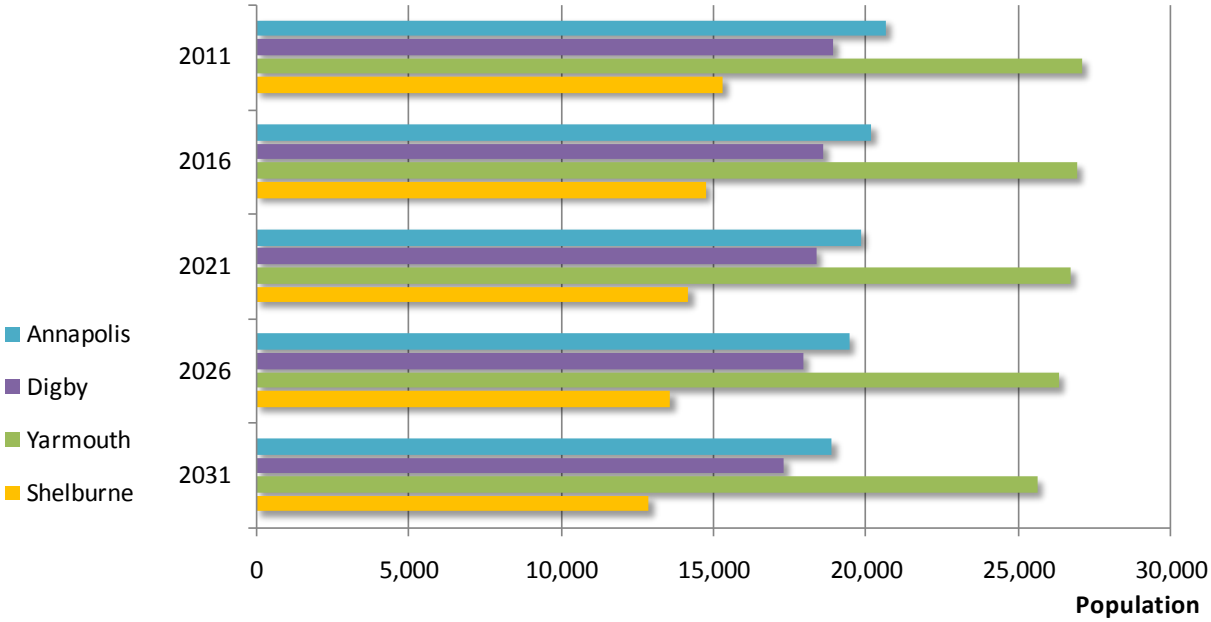
Overall, and depending upon many factors such as transportation service, we expect that tourism to SWNS will recover somewhat over the next 10 years as Americans get used to new border security and passport requirements and if the Canadian dollar does not appreciate too rapidly against the US dollar. Overall, visitation to Nova Scotia dropped 5.8 percent from 2004-08 and 2.8 percent between 2007 and 2008. Up to the end of September 2009, it had increased over 2008 volumes by less than 1 percent.[36] Tourism could recover with the economy in general and with strong advertising and some investments by tourism operators. On balance it seems likely that tourism will stabilize in SWNS, and perhaps recover slightly, as it appears to already be doing. At worst, a continued rise in the Canada-US dollar exchange rate, higher gasoline prices, and renewed border security concerns could continue to drive down tourism.

[35] "2008 Results", Nova Scotia Department of Tourism, Culture and Heritage, April 28, 2009.
[36] "Overnight Person Visits to Nova Scotia", 2004-2008, Nova Scotia Department of Tourism and Culture.

3.2.7 Population Gravity Traffic

As noted above, Statistics Canada projects a continued decline in the population of SWNS (Figure 3-12), from 82,000 in 2006 to around 75,000 by 2031. Every county will experience declines at rates faster than the province as a whole, which will see a mild decline in population from 913,000 in 2006 to around 900,000 by 2031.

Figure 3-12: Population Projection, South West Nova Scotia, Population, 2011-2031



Source: CPCS analysis of data from Statistics Canada Population Projections for Canada 2005, Nova Scotia Finance, Community Counts website

Given this population projection, it is most likely the case that population gravity traffic will exhibit a mild decline over the next 10 years. Traffic patterns will change in line with the continued development of regional service centres.

3.2.8 Summary of Industry Forecast, 2010-2019

This section summarizes the findings of the previous seven sections.

Fig 3-13 Summary Forecast by Industry Sector, 2010-2019

Industry	Outlook 2010-2019
Fishery and Fish Processing	The most likely scenario is for a return to the average harvest levels of the 10 years from 1997 to 2008 by 2011 with no further growth in the volume of fish products produced in SWNS. The optimistic scenario is that production of traditionally caught fish increase to the average 1997-2008 level by 2011, then increase slowly by 1.0 percent per year (not compounded). The pessimistic scenario assumes that the traditional fishery does not recover, but rather peaks in 2008, then declines by 0.5 percent per year (not compounded).
Agriculture	At the level of detail that is relevant for this study, agricultural traffic should be expected to stay roughly constant over the next ten years.

Tourism	Overall, in a high growth scenario we expect that tourism to SWNS will recover somewhat over the next 10 years as Americans get used to new border security and passport requirements and if the Canadian dollar does not appreciate too rapidly against the US dollar. As well, tourism could recover with the economy and with strong advertising and some investments by tourism operators. On balance it seems likely that tourism will stabilize in SWNS, and perhaps recover slightly. At worst, a continued rise in the Canada-US dollar exchange rate, higher gasoline prices, and renewed border security concerns could continue to drive down tourism, although it is hard to imagine rates of decline observed in recent years would be repeated.
Forestry	While a rebound in the US housing market could provide an opportunity for wood product manufacturers and loggers, given that the four largest sawmills in SWNS have all closed since 2000, the opportunity for SWNS to take advantage of this opportunity is questionable. Overall, it seems unlikely that forestry will drive an increase in traffic volumes in the long run. It is likely there will be some rebound in traffic as the economy in general, and the US housing market in particular, recovers in 2010 and 2011. However, this recovery will be offset by the fact that much of the capacity to produce wood products in SWNS has been closed permanently over the past 10 years.
Mining	Mining is unlikely to generate significant traffic in the next ten years.
Manufacturing	There are currently no plans to significantly expand manufacturing in SWNS. At the level of detail that is important for this study, traffic should be expected to stay roughly constant over the next 10 years.
Population Gravity Traffic	The most likely case is that population gravity traffic will exhibit a mild decline over the next 10 years. Traffic patterns will change in line with the continued development of regional service centres.

The study was expected to consider economic development opportunities in SWNS that could affect transportation demand. Stakeholder consultations which took place mid-way through the study solicited input from RDAs, business people and local residents. Many ideas were presented and synthesized by the study team, but they were not subjected to further analysis because the consultants were instructed to focus more of their efforts on the ferry configuration options and analysis (See Chapter 5). None of the ideas presented were considered "game changers" in terms of affecting transportation demand but some may be worthy of further study by economic development practitioners.

4 Regional Transportation System

4.1 Overview of Transportation System

The transportation system in SWNS has undergone enormous change in the past 15-20 years. Some of these changes include:

- Loss of rail service;
- Loss of year round ferry service between Yarmouth and Maine;
- Commercialization of federal ferry services in the Bay of Fundy;
- Divestiture of ports by the federal Department of Fisheries and Oceans and Transport Canada;
- Loss of *Scotia Prince* ferry service between Yarmouth and Portland, ME;
- Loss of Air Canada / Jazz airline service at Yarmouth;
- Introduction of the high speed *Cat* service between Yarmouth and Bar Harbor and then, Portland;
- Improvements to 100 series highways (101, 103); and
- Inauguration of air service between Yarmouth and Portland and Yarmouth and Halifax in February 2009, and subsequent loss of this service in December 2009.

While the transportation system has been affected by the economic trends in the fishery, the forest industry and tourism, stakeholders nonetheless remain optimistic and many, such as the ports in the region, have developed ambitious plans for the future.

The system now consists of much more local and private sector delivery of transportation services and infrastructure than was the case 20 years ago. It is also notable that the ferry service is struggling financially. It is also again dependent upon public support and investment in order to sustain operations.

4.2 Ferry System

Passenger transportation and ferry service have a long history in SWNS. Basically, the Bay of Fundy was the highway between this region and the biggest markets in North America.

4.2.1 Digby-Saint John

4.2.1.1 History and Characteristics

Ferry service has been provided across the Bay of Fundy between Digby and Saint John for about 175 years. In 1976, the service was transferred from Canadian Pacific to CN Marine (later renamed Marine Atlantic). In 1997, it was transferred again, from Marine Atlantic Inc., a federal crown corporation, to Bay Ferries Ltd., a subsidiary of Northumberland Ferries Ltd., in a process the Government of Canada has termed "commercialization." The service has been operated by

Bay Ferries since 1997, although the *Princess of Acadia* continues to be owned by the Government of Canada (in the custody of Transport Canada).[37]

In 2006, faced with rapidly rising fuel prices and declining traffic volumes, Bay Ferries found itself in a cost-revenue squeeze and announced it would withdraw service by the end of that year unless a solution could be found. It obtained a total of $8.1 million for the period 2006-09, from a number of sources, including the Government of Canada ($4 million), the governments of Nova Scotia and New Brunswick ($2 million each) and local governments. In August 2008 this assistance was extended to ensure the ferry will run until 31 January 2011 with a further $11.1 million from the Government of Canada and $2 million each from the governments of Nova Scotia and New Brunswick.

The 2009 schedule for this service is presented in the figure below.

Figure 4-1: Digby-Saint John Ferry Schedule, 2009

Saint John to Digby							
2009 Dates	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
Jan 2 – May 2	9:00	9:00	9:00	9:00	9:00	9:00	9:00
May 3 – Jun 10	9:00 23:00	12:15	12:15 23:00	12:15 23:00	12:15 23:00	18:30	12:15
Jun 21 – Sep 12	12:30 23:00	12:30 23:00	12:30 23:00	12:30 23:00	12:30 23:00	12:30 23:00	12:30 23:00
Sep 13 – Oct 10	9:00 23:00	12:15	12:15 23:00	12:15 23:00	12:15 23:00	18:30	12:15
Oct 11 – Dec 31	9:00	9:00	9:00	9:00	9:00	9:00	9:00

Note: There are no scheduled sailings on Dec 25, Jan 1, and Oct 10 (18:30 sailing)

Digby to Saint John							
2009 Dates	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
Jan 2 – May 2	16:30	16:30	16:30	16:30	16:30	16:30	16:30
May 3 – Jun 10	16:30	8:00 16:30	16:30	8:00 16:30	8:00 16:30	14:30	8:00 16:30
Jun 21 – Sep 12	8:30 16:30	8:30 16:30	8:30 16:30	8:30 16:30	8:30 16:30	8:30 16:30	8:30 16:30
Sep 13 – Oct 10	16:30	8:00 16:30	16:30	8:00 16:30	8:00 16:30	14:30	8:00 16:30
Oct 11 – Dec 31	16:30	16:30	16:30	16:30	16:30	16:30	16:30

Note: There are no scheduled sailings on Dec 25, Jan 1, and May 3 (08:00 sailing)
Note: All departures are in Atlantic Time. Ferry crossing approximately 3 hours long.
Source: Bay Ferries website.

[37] All real property "owned" by the Government of Canada is in fact owned by Her Majesty. Federal departments are assigned custody of the real property to support programs. In effect custody grants departments all the benefits of ownership.

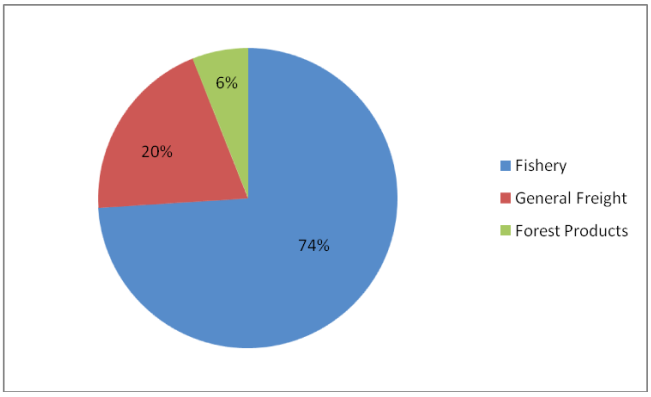
4.2.1.2 Role in Regional Transportation System and Economy

The Digby-Saint John service has an important role in the regional transportation system, although with ongoing improvements to the Maritime region's highway system, its overall catchment area has diminished in the past 10 years.

Most critically, perhaps, the service saves seafood shippers a long drive around Nova Scotia, which – through savings in time to reach market - lessens mortality of live product and helps retain the quality of fresh product. There is no question that the time, and therefore cost, savings associated with the ferry service, induce activity in the SWNS fishery that would not otherwise by viable. A quantification of this impact is outside the scope of this study, but it is worth emphasizing that representatives of the fishing industry in SWNS were among the most vocal supporters of the Digby-Saint John ferry. In their view, the ferry is essential to the success of their industry.

Other traffic elements carried on the service include general cargo and forest products, the latter of which have diminished with the decline in the forest industry. The Figure below indicates the importance of the fishery to the ferry service.

Figure 4-2: Digby-Saint John Commercial Traffic, October 2008-Septmber 2009



Source: Bay Ferries

The Digby-Saint John ferry service also plays a key role in the movement of tourists, particularly Canadian visitors, into and out of SWNS. It also carries some commuter traffic across the Bay of Fundy. According to research conducted for Bay Ferries, the *Princess of Acadia* serves the following passenger markets:

Figure 4-3: Digby-Saint John Passenger Market, 2004-2008 (Percentage)

Market	2004	2005	2007	2008
Ontario	26	25	23	21
Nova Scotia	14	20	18	20
New Brunswick	19	15	14	19
Massachusetts	4	3	9	6
Quebec	6	6	4	3
Maine	4	3	4	4
New York	2	1	3	3
Other USA	16	14	18	15
Other Canada	5	6	5	6

Source: Bay Ferries

Until 2-3 years ago, the service was used by the Irving Group to move wood chips from its chip plant in Weymouth to its mill in Saint John. Irving now has 70,000 acres of "non-strategic" woodlands in SWNS for sale. The decision to cease shipping across the Bay of Fundy was related to the cost of shipping, via ferry or by the company's fleet of tugs and barges, neither of which could compete with alternative sources of wood found closer to Saint John.

Bay Ferries has been engaged in attracting several new commercial users and is meeting with some success in that regard.

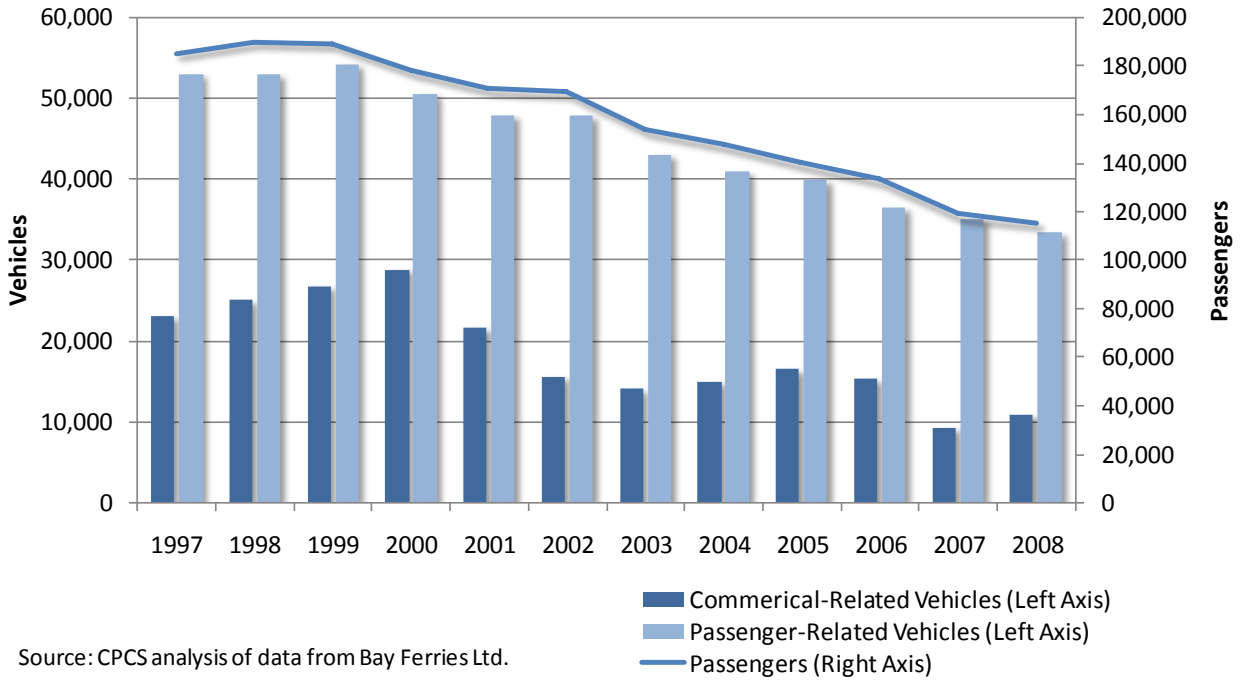
4.2.1.3 Traffic Volume

Since Bay Ferries took over the service, passenger traffic peaked in 1998 at 190,246.[38] Since 1998, passenger traffic has declined about 39 percent to about 116,000. Passenger related vehicles (PRVs) peaked in 1999 at 54,337 (the peak for PRVs was in 1989 at 66,547), and have declined to 33,497, or 38 percent.

Commercial-related vehicles (CRVs) were at a historical peak in 2000 at 28,945, when the company was moving significant volumes of wood chips for the Irving Group of companies. According to Bay Ferries, average annual truck traffic on the Digby-Saint John ferry service is around 75 percent fish and seafood. Based on 2008 CRV traffic, which amounted to about 11,000 units (5,700 in Digby-Saint John direction), this suggests that approximately 4,275 trucks carrying fish are using the ferry on an annual basis. This truck volume represents movements of between 65,000 and 75,000 tonnes of seafood, based on an estimated average cargo per trailer of 35,000 to 40,000 lbs of fish and seafood.

[38] The absolute peak in passenger traffic was recorded in 1983 at 241,613 passengers.

Figure 4-4: Traffic, Digby-Saint John Ferry, 1997-2008



Source: CPCS analysis of data from Bay Ferries Ltd.

4.2.1.4 Infrastructure

4.2.1.4.1 Princess of Acadia

The MV *Princess of Acadia* (Figure 4-5) was purpose-built for the service by Saint John Shipbuilding and Drydock on behalf of the Canadian Pacific Railway Company, and was launched in 1971. While the operation of the service was subsequently transferred to Marine Atlantic in 1976 and then to Bay Ferries in 1997, the *Princess of Acadia* has remained in service over that period. The principal particulars of the *Princess of Acadia* are noted in Figure 3-2.

Figure 4-5: MV *Princess of Acadia*

Source: Bay Ferries

Figure 4-6: Principal Particulars of the MV *Princess of Acadia*

Vessel Characteristic	Description
Owner:	Government of Canada
Manager:	Bay Ferries Ltd.
Year Built:	1971
Builder:	Saint John Shipbuilding & Drydock
Home Port:	Saint John
IMO #:	70395567
Official Number:	331571
Gross Tonnage:	10051
Registered Tonnage:	7012
Class:	LRS 100 A1+LMC, "Bay of Fundy Service"
Passenger Capacity:	650 passengers + 42 crew
Vehicle Capacity:	40 Trailers and 7 trucks or 159 cars
Length Overall:	480 feet (146.31m)
Breadth Moulded:	66 feet (20.12m)
Depth Moulded to Upper Deck:	40 feet (12.19m)
Depth Moulded to Vehicle Deck	21 feet (6.40m)
Draft- All Season (full)	15.25 feet (4.65m)
Lightship (Nov. 1997)	4209 LTons (4277 tonnes)
Deadweight at Draft (from new lightship)	2060 LTons (2093 tonnes)
Speed	20 Knots
Lane Metres	637 metres
Main Engines	4 x GM, model 16-645 E-5, Rated at 2875 bhp ec. @ 900 RPM
Generators	3 x 650 kW, 480 VAC
Boilers	x Steam generator boilers total output 13800 lb/hour @40 ps

4.2.1.4.2 Ferry Terminals

The introduction of the *Princess of Acadia* required new terminal infrastructure in both Digby and Saint John. In Digby, the terminal was moved outside town to a location near the mouth of the Annapolis Basin (Figure 4-7). The ferry terminals in Digby and Saint John continue to be owned by the Government of Canada (in the custody of Transport Canada) and leased to Bay Ferries for a nominal amount.

Figure 4-7: Digby Ferry Terminal with the *Princess of Acadia*

Source: CPCS

Government of Canada assets are periodically inspected to ensure their safety, operating capability and their remaining life under normal usage and maintenance. Recent inspections indicate that the terminal and the shore-based assets will require some major repairs and maintenance to ensure that they remain in safe operating condition. Transport Canada has provided estimates which suggest the terminals in Digby and Saint John will require $11.45 million in maintenance for the period 2010-2019.

4.2.1.5 Current Issues

4.2.1.5.1 Age and Condition of the Princess of Acadia

As noted above the *Princess of Acadia* entered service in 1971 as a new purpose-built vessel and has, excluding refit periods, been in continuous service ever since. At 39 years old, it is nearing the end of its lifecycle. Recent technical assessments indicate that the *Princess of Acadia* will require some major repairs to maintain the current level of service. The residual market value of the *Princess of Acadia* was estimated at from $1.0–$1.5 million, which would not increase as substantial repair, maintenance and regulatory compliance expenditures are made. In addition to being an increasingly expensive vessel to keep in service, the vessel, while being refurbished, lacks a number of amenities currently available in new ferries.

Over its design life, a ferry has a relatively predictable annual stream of operating and capital expenditures which are required to maintain a particular level of service (e.g. measured by passenger capacity, speed, and reliability). While it is always possible to keep a ship in service up to and even beyond its design life, in a competitive market this seldom occurs. The cost of maintaining an old ship to a desired service level gradually increases to the point where it is simply less expensive on an annual basis to acquire a new ship.

4.2.1.5.2 Price Sensitivity of User Charges

Past research has indicated that rates for the Digby-Saint John service are high and are likely affecting the demand. In customer satisfaction surveys conducted by Corporate Research Services for Bay Ferries, lowering prices was identified by 21 percent of the surveyed population.

It is noted that these remarks are being made by individuals who have chosen to travel on the service and do not include sentiments of those who have chosen not to travel because of the rates. While no known research is available on the discouraged travellers, substantive anecdotal information has been gathered by the consulting team over the past few years that rates are discouraging travel.

4.2.1.5.3 Time and Cost Savings of the Ferry Relative to Alternatives

For passenger-related traffic, reducing the amount of driving and saving time are cited frequently as primary reasons for taking the Digby-Saint John ferry service.

Billions of dollars of highway improvements have been made in Nova Scotia and New Brunswick within the past 10-15 years that have lessened both the time and distance advantages of the ferry service. These include a new border crossing to the United States on Route 1 in New Brunswick which opened in 2009, lessening delays for both passenger and commercial traffic.

Additional improvements are planned on New Brunswick's Route 1 and the 100-series highways in Nova Scotia over the next few years.

Nonetheless, the Digby-Saint John connection continues to offer driving distance and associated cost savings to SWNS commercial traffic, lessens roadway vibration effects on fresh seafood products and provides rest time for drivers. Highway improvements do, however, reduce the catchment area of the ferry service for all types of commercial traffic.

4.2.1.5.4 Schedule and Frequency of Ferry Services

Peak-season sailings out of Saint John were changed from an early morning departure time to a late morning departure during the 2009 operating season. This also moved the departure out of Digby from early afternoon to late afternoon. While welcomed by the fish processing industry, who are scheduling shipments to reach the Boston fish market early the following day, according to Bay Ferries, this switch appears to have reduced the amount of passenger traffic from Saint John.

4.2.1.6 Planned Projects

4.2.1.6.1 Vessels

Transport Canada is currently assessing a number of options for the *Princess of Acadia*, in light of its current condition and the estimated costs to maintain the vessel in a safe condition, as part of its asset management activities.

4.2.1.6.2 User Charges

User charges were unchanged in 2009 compared to 2008. Despite wide fluctuations in the price of petroleum, fuel surcharges have not been changed since 2006. Passenger surveys have indicated stable, if not slightly increasing satisfaction, with "value received for price paid."

Bay Ferries also note that several "value packages" are being arranged in the form of package deals. For instance, ferry travel and golf packages on the *Princess of Acadia*.

Future fares will be established in consultation with stakeholders and government bodies who are currently providing operating and capital contributions.

4.2.1.6.3 Time and Cost Savings

We have not been privy to Bay Ferries financial data, but our understanding of their current operation suggests using the *Princess of Acadia* and its current schedule provides little scope to reduce ferry crossing times or operating costs.

4.2.1.6.4 Schedule and Frequency of Ferry Services

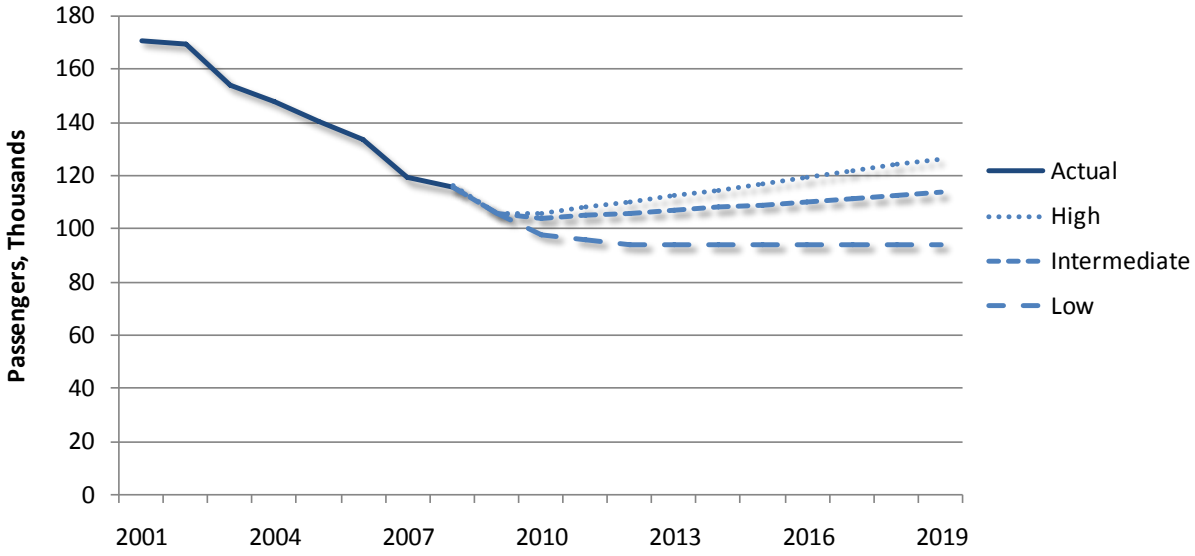
Bay Ferries is considering the impact of the schedule change on traffic originating in Saint John. The most likely change in 2010 will be a slight adjustment in the existing schedule to leave Saint John earlier in the peak season. During the past number of years the number of sailings provided by the *Princess of Acadia* has been reduced to reflect declining demand and to save operating expenses. Should demand warrant, and operating expenses covered, additional sailings can be added to this crossing.

4.2.1.7 Forecast

Transport Canada recently commissioned a study to determine the socio-economic impact of the Digby – Saint John ferry service. [39] As part of this study, anticipated demand for the service was forecast over a 10-year period. Figure 4-8, Figure 4-9, and Figure 4-10 present preliminary forecasts for passenger, passenger-related vehicle, and commercial-related vehicle respectively traffic between 2010 and 2019. Three scenarios are presented: intermediate, low, and high. Detailed forecasts are included in Appendix B.

In the intermediate scenario passenger and related traffic is forecast to rebound by 4.0 percent in 2010, followed by a subsequent annual growth of 1.0 percent (Figure 4-8 and Figure 4-9). The initial recovery is anticipated as a result of upcoming schedule refinements proposed by the operator in an effort to recapture a portion of the passenger market lost in recent years. Long term growth is estimated at a modest 1.0 percent given that general levels of economic activity in the study area are not expected to rebound significantly over the medium term.

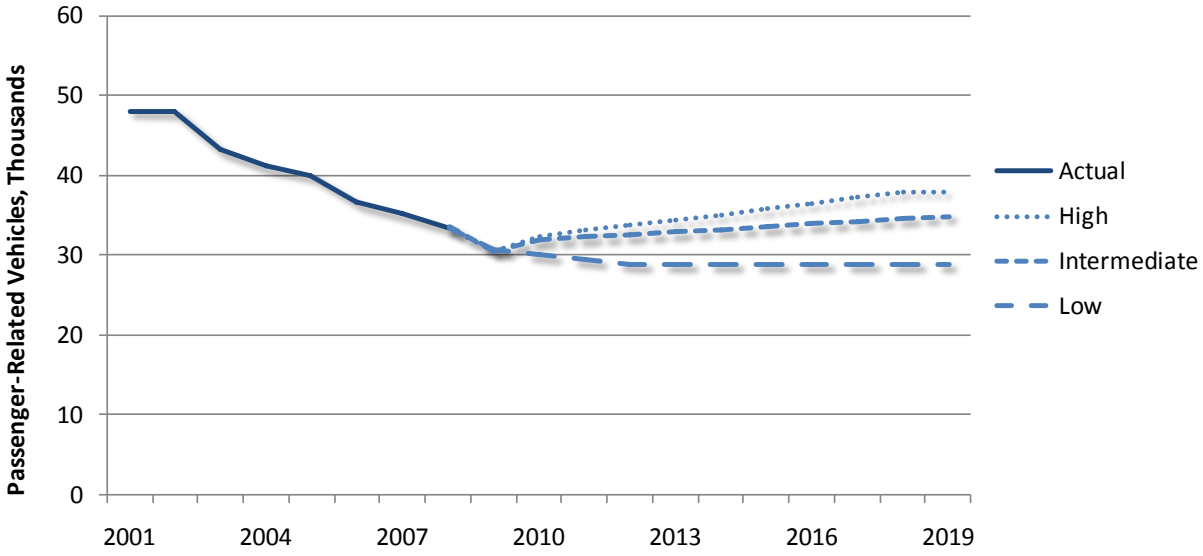
Figure 4-8: Digby-Saint John Ferry Passenger Traffic Forecast, 2010-2019



Source: *Digby to Saint John Ferry Service: Economic Impact Assessment Update*. Opus international Consultants Canada Ltd. 2009

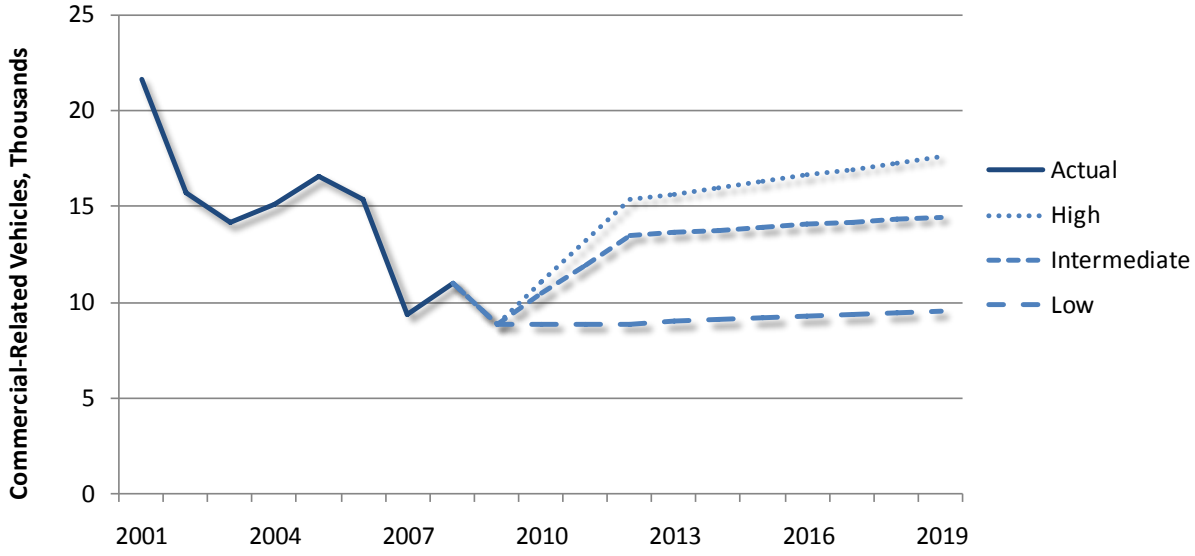
[39] Opus International Consultants Canada Ltd., "Digby to Saint John Ferry Service: Economic Impact Assessment Update", 2009.

Figure 4-9: Digby-Saint John Ferry Passenger-Related Vehicle Traffic Forecast, 2010-2019



Source: *Digby to Saint John Ferry Service: Economic Impact Assessment Update*. Opus international Consultants Canada Ltd. 2009

Figure 4-10: Digby-Saint John Ferry Commercial Traffic Forecast, 2010-2019



Source: *Digby to Saint John Ferry Service: Economic Impact Assessment Update*. Opus international Consultants Canada Ltd. 2009

Meanwhile, commercial related traffic is expected to see double-digit percent increases over the next three years, based primarily on the following three factors (Figure 4-10):

- Fish landings are expected to return to 10 year industry averages;

- The volume of forestry-related movements is expected to rebound slightly to a level of approximately one-third of historical peak levels; and

- Planned upgrades to the NB Southern Railway will provide an enhanced rail alternative for shippers, resulting in an increase in drop trailer traffic on the ferry service.[40]

Beyond 2013, growth will be limited to the general freight traffic component, resulting in annual increases of 1.0 percent. Again, detailed forecasts are included in Appendix B.

4.2.1.8 Suitability for Serving Current and Forecast Traffic Flows

Based on an assessment of travel demand factors the consulting team has prepared traffic forecasts which contemplate modest levels of growth from current traffic levels.

Suitable capacity is available using the current ship and schedule of the Digby-Saint John ferry service. According to Transport Canada, during peak season deck capacity utilization on the Princess of Acadia averages 60-65 percent. However, stakeholders noted that some vehicles can be left behind at specific crossings during the peak period.

4.2.2 Yarmouth-Maine

Historically, ferry service has been offered from Yarmouth to both Bar Harbor and Portland. This section treats these two routes as one service, since the current configuration involves Bay Ferries providing service on both routes using the same vessel.

4.2.2.1 History and Characteristics

Ferry service between Yarmouth and Bar Harbor has been provided since 1956. Historically, the Government of Canada operated the service through Crown Corporations, first Canadian National, and then from 1986 to 1997 through Marine Atlantic Inc.[41] The Marine Atlantic Inc.

[40] In July, 2009 it was announced that federal and provincial funding totalling $18 million will be directed to the New Brunswick Southern Railway to allow it to upgrade or replace ties, rail, the rail bed, bridges and terminals. The company will contribute an additional $18 million to this project which is expected to be completed by the end of 2010. Once completed, the railway will have the capacity to handle 286,000 pound rail cars compared to the existing capacity allowance of 263,000 pounds.

The New Brunswick Southern Railway, and its subsidiary company Eastern Maine Railway (both companies are subsidiaries of J.D. Irving Limited of Saint John), own and operate the 307 kilometres of railway between Saint John New Brunswick and Brownville Junction Maine. This railway line was formerly owned by Canadian Pacific Railway prior to formal abandonment in 1994. Railway connections to the east and south are available at Brownville Junction and as such it is an important link for rail and multi-modal traffic travelling to/from Saint John and points beyond.

The upgrading of this portion of railway infrastructure to Class I railway status will considerably enhance the viability of railway and multi-modal transportation shipments in this area, including shipments by ferry.

[41] In 1956, the Yarmouth-Bar Harbor service was inaugurated with a new vessel, *Bluenose*, constructed at Lauzon, Quebec. The vessel was 346 feet in length and 65 feet in beam, and carried over 500 passengers and 150 automobiles. The vessel revived the fortunes of both Yarmouth and Bar Harbor,

service was transferred to Bay Ferries in 1997 and a new high speed Incat ferry called the *Cat* was introduced in 1998.[42] This vessel, discussed in more detail below, is one of the fastest and most sophisticated ferries in the world, and is capable of making the crossing to Bar Harbor in 2.5 hours, but actual sailing time is 3 hours. The schedule has changed since Bay Ferries began serving Portland; Figure 4-11 reflects the current (as of October 2009) schedule.

In contrast to the Digby-Saint John service, the Yarmouth-Maine service does not run in the winter. In 2009, service ran from the end of May until the middle of October.

Figure 4-11: Yarmouth-Bar Harbor Ferry Schedule, 2009

Bar Harbor to Yarmouth							
2009 Dates	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
May 31 – Jul 3	9:00	8:00		8:00			
Jul 4 – Sep 7	9:00	8:00	8:00				
Sep 8 – Oct 12	9:00	8:00		8:00			

Note: All departures from Portland are Eastern Time.

Yarmouth to Bar Harbor							
2009 Dates	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
May 31 – Oct 12	17:00	16:00					

Note: All departures from Yarmouth are Atlantic Time.
Note: Ferry crossing approximately 3 hours long.
Source: Bay Ferries website.

Ferry service between Yarmouth and Portland dates from 1969.[43] From 1982 to 2000 the service was provided by Prince of Fundy Cruises. The owner of Prince of Fundy Cruises passed

although Yarmouth was disappointed in a decision to have the vessel overnight in Bar Harbor. The service provided an outlet to New England for Yarmouth lobster and Christmas trees, and brought tourists and their cars in the opposite direction.

The original *Bluenose* was replaced by a "new" vessel, the former *Stena Jutlandica*. It was built in Yugoslavia in 1973 and was 125 m LOA, 23.3 m beam and once modified for Canadian operations, had capacity for 1,000 passengers and 250 cars. Traffic on the "new" *Bluenose* peaked in its first year of operation, 1983, at 127,555 passengers. It came close to reaching that level in 1988 and 1989.

[42] Strictly speaking the *Cat* is the name of the service and not the vessel. This Report uses the term *Cat* to refer to the vessel as well as the service, as is common practice in SWNS.
[43] That year, a Scandinavian-backed company, Lion Ferry, introduced the *Prince of Fundy*, a modern, Swedish-built ro-ro vessel, which carried 200 vehicles and 1,000 passengers. The service was also financially supported by the Nova Scotia provincial government. The service was a success and began operating year round. *Prince of Fundy* was soon joined by a second vessel, *Bolero*, in summer, and for a

away in 1996 and his estate put the company up for sale in 1999. In 2000, a group led by Matthew Hudson of Virginia took over the service and the company was renamed Scotia Prince Cruises. In 2004 the company discovered high levels of mould in the Portland terminal and cancelled its 2005 season. By this time, traffic levels had also declined substantially (see below).

Figure 4-12: Yarmouth-Portland Ferry Schedule, 2009

Portland to Yarmouth							
2009 Dates	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
May 31 – Jul 3					8:00		8:00
Jul 4 – Sep 7				8:00	8:00	8:00	8:00
Sep 8 – Oct 12					8:00		8:00
Note: All departures from Portland are Eastern Time.							

Yarmouth to Portland							
2009 Dates	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
May 31 – Jul 3				16:00	16:00		16:00
Jul 4 – Sep 7			16:00	16:00	16:00	16:00	16:00
Sep 8 – Oct 12				16:00	16:00		16:00
Note: All departures from Yarmouth are Atlantic Time.							
Note: Ferry crossing approximately 5.5 hours long.							

Source: Bay Ferries website.

In 2006, after the closure of Scotia Prince Cruises, Bay Ferries reached an agreement with the Government of Nova Scotia, and began calling at both Bar Harbor and Portland with the *Cat*. In 2009, the company was to receive "up to" $12.0 million for operating the service.[44]

The Portland service is also now provided by Bay Ferries Ltd., using the *Cat*. The crossing time is 5.5 hours.

time Yarmouth was served by three ferries during the summer months. In 1976, winter service was suspended and taken up by then CN Marine, with a vessel called *Evangeline*.

Lion Ferry replaced *Prince of Fundy* with *Caribe*, built in 1969 and now sailing as *Discovery Sun* between Florida and the Bahamas. Lion Ferry was sold to Prince of Fundy Cruises in 1982, and another Scandinavian cruise ferry, Stena *Olympica*, a sistership to *Bluenose,* was acquired and renamed *Scotia Prince*. Its capacity was originally the same as *Bluenose* but it was "jumboized" in 1987, which lengthened it and increased capacity to 1,200 passengers.

[44] "Province Invests in Transportation Link to United States", Nova Scotia Department of Economic and Rural Development, January 22, 2009.

4.2.2.2 Role in Regional Transportation System and Economy

The role of the Yarmouth-Bar Harbor service has changed and evolved in the past 10-15 years.[45] Marine Atlantic Inc. cut its winter service in the early 1990s and Bay Ferries' move to a high speed vessel eliminated the transportation of fish and seafood in winter, because the *Cat* does not carry trucks. This has meant that these products now move via Digby and Saint John, if, indeed, they move by ferry.[46]

The Yarmouth-Bar Harbor service's role in the economy of SWNS mainly relates to the tourism industry, since the vessel does not carry commercial traffic. It is an important part of the tourism infrastructure of this region and the province as a whole. It also directly employs some 100 people in Yarmouth.

The Bar Harbor service caters to several types of tourist. It appeals to people travelling by car from New England and further south to Nova Scotia and the Maritime provinces. With the pre-2006 schedule, it also appealed to so-called day-cruisers wishing to travel from Bar Harbor to Nova Scotia on the fastest vessel in North America.[47] The decision to split the service between Bar Harbor and Portland in 2006 had a huge impact on the company's day cruise (walk on) business and overall passenger volume (see below).

An important part of Bay Ferries' market was motorcoach tours, which peaked at 411 in 2003 and have fallen to just 67 in 2009. From 2004-2009, the numbers of motorcoach visitors to the province has dropped, from 92,000 to 68,000. At an estimated 40-50 people per motorcoach, this would equate to a drop from 1,840-2,300 to 1,700-1,360 vehicles.

Figure 4-13 Bay Ferries Motorcoach Volume, 2003-2009

Year	Motorcoaches
2003	411
2004	369
2005	344
2006	273
2007	239
2008	169
2009	67

Source: Bay Ferries

The Portland service helped extend the reach of Nova Scotia's marketing into the mid-Atlantic and south eastern United States. The Bar Harbor service is thought to cater to northern New England and visitors to Acadia National Park, while the Portland service caters to points further south. Before the demise of Prince of Fundy Cruises, one of that company's niches was

[45] From 1956 until 1998, Yarmouth was a gateway for fish, seafood and forest products being shipped to New England via the ferry service. More than 6,000 commercial vehicles used the service in 1984, but the collapse of the fishery in the 1990s saw volumes decline substantially, and volumes only averaged 3,367 units per annum from 1986-1995..

[46] Some shippers and / or truckers elect to drive around via the Cobequid Pass and the Tantramar Marsh. During sector consultations the consultants were informed that this decision depends upon when the catch is processed and ready for shipment, as well as whether or not there is room on the vessel, particularly in the summer.

[47] Market data has not been provided to the study team.

motorcoach companies moving passengers from the New Jersey area, putting them on the vessel and after a 24 hour cruise, taking them back home. The company's FIT business also attracted customers from further south than Marine Atlantic's *Bluenose* or Bay Ferries' *Cat*. The provincial government was anxious to preserve the more southerly departure point in order to continue to attract customers beyond New England and Bay Ferries was also eager to enter the Portland market.

At one time, upwards of 170,000 passengers travelled on *Scotia Prince*, between Yarmouth and Portland.[48] The market for the service comprised approximately 50,000 people in motorcoaches (1,000+ units), 50,000 24-hour mini-cruise passengers who were bussed to Portland and spent a night onboard before returning to Portland, 15,000 "auto tours" packages, and approximately 50,000 "free independent travellers" (FIT) using their own autos to drive to Portland and then tour the Maritimes. The service received extensive support from the Province and partnered with many tourism operators.

The data below indicate that in 2008, the largest market for the service overall was in Massachusetts, followed by Nova Scotia and Ontario. The Portland service was most popular with Massachusetts residents while the Bar Harbor service was most popular with Ontario residents.

Figure 4-14: Yarmouth-Maine Passenger Market O/D, 2004-2008 (Percentage)

Market	2004	2005	2007	2008		
				Total	Portland	Bar Harbor
Massachusetts	12	11	18	19	26	8
Nova Scotia	8	8	9	12	12	11
Ontario	7	10	7	8	5	20
New York	8	7	8	7	8	4
Maine	7	7	6	7	9	5
New Hampshire	n/a	7	5	7	10	-
New Jersey	n/a	n/a	4	4	n/a	n/a
Pennsylvania	n/a	4	5	4	n/a	n/a
Connecticut	n/a	n/a	6	3	n/a	n/a

Source: Bay Ferries

Prior to the assumption of the route by Bay Ferries Ltd., the Yarmouth-Portland service provided travellers from southern New England and the mid-Atlantic region with a convenient and comparatively inexpensive cruise to Nova Scotia, which was both their overnight accommodation and means for getting from the US to Canada. This experience applied to both bus tour and FIT travellers. The 24-hour cruisers had at least a few hours to experience a foreign land. Prince of Fundy Cruises worked with hotel and other tourism attractions to package Nova Scotia and other areas in the Maritimes, such as PEI.

Since Bay Ferries took over the service in 2006, the *Cat* provides a fast means of travelling from Maine to Nova Scotia, thus saving many miles of driving. It also saves time for people whose

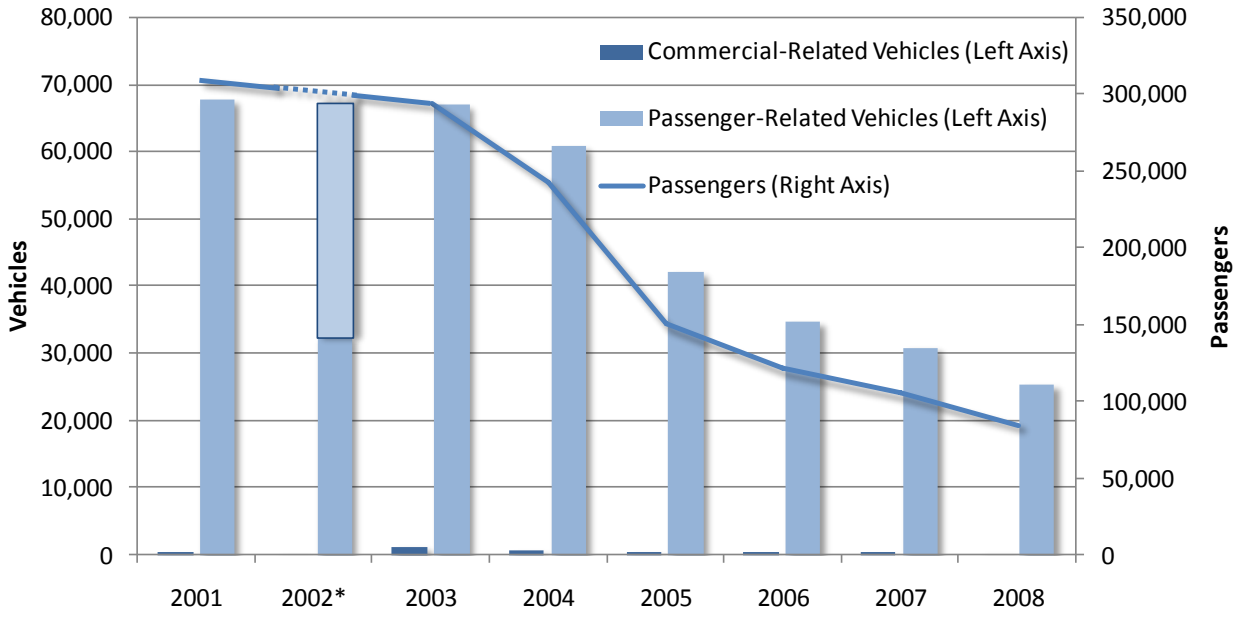
[48] Marine Atlantic Inc., 1991 Marketing Plan.

ultimate destination is Yarmouth or SWNS. For people travelling to Halifax, it saves actual driving time. Bay Ferries has also worked with tourism operators on both sides of the border to provide attractive hotel and getaway packages.

4.2.2.3 Traffic Volumes

Total (both Bay Ferries and Prince of Fundy combined) Yarmouth-Maine ferry traffic since 2001 has fallen dramatically. The number of passengers has fallen by 73 percent, from 310,000 in 2001 to less than 85,000 in 2008. Passenger related vehicles fell 63 percent from 68,000 in 2001 to just over 25,000 in 2008.

Figure 4-15: Traffic, Yarmouth-Maine Ferries, 2001-2008



Source: CPCS analysis of data from Bay Ferries Ltd. and Scotia Prince Cruises
Note: *Bay Ferries *Cat* only, *Prince of Fundy* data not available. Dotted line and outlined column reflect estimated value based on linear interpolation.

Since Bay Ferries took over the Yarmouth-Bar Harbor service from Marine Atlantic in 1997, passenger traffic peaked in 2002 at 165,000 passengers, and passenger related vehicles (PRVs) peaked in 1999 at almost 46,000. Compared to the previous year when operating the old *Bluenose* ferry the introduction of the high speed *Cat* in 1998 had an immediate positive impact on traffic levels. Passenger traffic levels on the Bar Harbor service increased 87 percent, as the *Cat* attracted attention from around the world. Similarly, the introduction of a newer version of the *Cat* in 2002 was associated with a 10 percent rise in passenger traffic (Figure 4-16).

Until 2006, when the *Cat* began serving Portland, traffic on the Yarmouth-Bar Harbor ferry service can be summarized as follows:

Figure 4-16: Yarmouth – Bar Harbor Ferry Traffic, 2001-2005 (both directions)

Traffic Type	2001	2002	2003	2004	2005
Passengers	149,465	165,046	146,856	133,524	149,507
PRVs	34,955	44,273	40,514	37,306	42,100
CRVs	168	158	411	369	344

Source: Bay Ferries Ltd.

On a directional basis, Bar Harbor to Yarmouth traffic can be summarized as follows:

Figure 4-17 Bar Harbor – Yarmouth Traffic, 2001-2005 (to Yarmouth)

Traffic Type	2001	2002	2003	2004	2005
Passengers	75,291	83,242	73,364	66,318	79,109
PRVs	17,846	22,397	20,431	18,586	21,758
CRVs	66	71	156	147	231

Source: Bay Ferries Ltd.

The consultants obtained traffic volumes for the period when Prince of Fundy Cruises operated the service up 2004. There was a one-year hiatus, after which Bay Ferries began operating this route.

Figure 4-18: Portland-Yarmouth Traffic, 2000-2004 (both directions)

Traffic Type	2000	2001	2002	2003	2004
Passengers	157,491	160,118	n/a	147,642	108,810
PRVs	31,845	32,692	n/a	26,360	23,446
CRVs	146	139	n/a	761	193

Source: Anonymous

Since 2006, Bay Ferries has operated from Yarmouth to both Bar Harbor and Portland, and the combined totals for both routes are shown below.

Figure 4-19: Combined Bar Harbor and Portland Service Traffic, 2006-2009 (both directions)

Traffic Type	2006	2007	2008
Passengers	120,561	104,797	84,518
PRVs	34,738	30,910	25,376
CRVs	273	239	169

Source: Bay Ferries

Since Bay Ferries began to serve Portland, the Maine to Yarmouth traffic can be summarized as follows:

Figure 4-20 Maine to Yarmouth Traffic, 2006-2009

Traffic Type	2006	2007	2008
Passengers	64,410	55,548	44,637
PRVs	18,201	16,102	13,359
CRVs	198	157	118

Source: Bay Ferries

As above, day cruise and packages are an important part of Bay Ferries' market. Bay Ferries provided the following day cruise and package data:

Figure 4-21 Bay Ferries Day Cruise and Package Tours, 2004-2009

Year	Day Cruise	Packages	Total Passengers
2004	29,878	33,783	133,524
2005	26,678	34,023	149,507
2006	13,460	18,359	120,561
2007	10,594	12,700	104,797
2008	7,662	9,912	84,518
2009	5,318	15,169	75,639

Source: Bay Ferries

It is evident that the *Cat's* combined traffic levels for both routes have fallen well below those experienced when it operated to Bar Harbor only, and when *Scotia Prince* was operated between Yarmouth and Portland. In summary, over the past eight years, passenger traffic on the Yarmouth–Maine corridor has fallen from a peak of 310,000 to less than 85,000, a drop of 72.5 percent.

4.2.2.4 Infrastructure

4.2.2.4.1 The Cat

The current version of the *Cat* is a 98-metre class wave-piercing catamaran completed as Hull 059 in April, 2002 by Incat Tasmania Pty. Ltd. of Hobart, Australia. With capability of cruising at speeds in excess of 40 knots, it is one of fastest and most sophisticated ferries in the world. Principal particulars of The Cat are noted in Figure 3-3 below.

Figure 4-22: Principal Particulars of the *Cat*

Vessel Characteristics	Description
Owner/Manager:	Bay Ferries Ltd.
Builder:	Incat Tasmania Pty. Ltd.
Class Society:	Det Norske Veritas- DNV + 1A1 HSLC R1 Car Ferry "B" EO
Length Overall:	97.22 metres
Length at Waterline:	92.00 metres
Beam Overall:	26.6 metres
Draft:	3.42 metres maximum
Speed:	36 knots @ 750 tonnes DW and 40 knots at 375 tonnes DW
Maximum Deadweight:	750 tonnes
Passenger Capacity:	900

Vehicle Capacity:	240
Construction:	April, 2002
Main Engines:	4 Rushton 20RK270 or Catapillar 3618 marine diesel, each rated at 7080 kw
Water Jets:	4 Lips 120E waterjets
Transmission:	4 Reintjes gearboxes
Ride Control:	Marine Dynamics active ride control system

With the *Cat*, service is restricted to passengers, PRVs, recreational vehicles and buses. Commercial traffic does not use this vessel. The vessel could carry a limited number of trucks but the operator prefers to move these vehicles across the Digby – Saint John ferry, for both aesthetic and operational reasons.

The *Cat*

Source: CPCS

4.2.2.4.2 Ferry Terminals

The Yarmouth ferry terminal is owned by the Government of Canada (in the custody of Transport Canada). The Bar Harbor ferry terminal is owned by Marine Atlantic Inc. Both are leased to Bay Ferries for a nominal amount. Recent inspections indicate that the terminal and the shore-based assets will require some major repairs and maintenance to ensure that they remain in safe operating condition. Transport Canada provided an estimate of $11.5 million to maintain the terminals in Yarmouth and Bar Harbor for the period 2010-2019.

The Ocean Gateway Marine Terminal in Portland is a new facility which was opened in 2006. A new passenger terminal, capable of handling cruise vessels and ferries, was built in Portland and opened in 2008, and the *Cat* began calling there that year. It is owned by the City of Portland.

Figure 4-23: Yarmouth Harbour and Ferry Terminal (red box)

Source: CPCS from Government of Canada

4.2.2.5 Current Issues

4.2.2.5.1 Passenger Comfort

High speed ferries sometimes cause substantive levels of motion sickness which increase in rougher seas. The consulting team has found no scientific research to quantify this impact or to compare it to levels of discomfort experienced on conventional ships. However, motion sickness is frequently cited in customer satisfaction surveys as a reason why the *Cat* would not feature in future travel plans. It is believed that longer crossings increase the likelihood of motion sickness occurrence and the 5.5-hour Portland crossing is one of the longest crossings in the world for vessels of this type.

4.2.2.5.2 Schedules

Schedule changes have been made to both Bay of Fundy ferry services over the past couple of years. In 2009, for instance, peak service out of Bar Harbor was offered only from Monday to Wednesday on a once per day frequency. Prior to the introduction of Portland into the schedule, two round trips per day between Yarmouth and Bar Harbor were made. The operator has noted the loss of a significant number of walk-on passengers during the 2009 operating season from reduced Bar Harbor sailings.

4.2.2.5.3 Price Sensitivity of User Charges

Past research has indicated that rates for the Bay of Fundy ferry services are high and are likely affecting the demand for the *Cat*. In customer satisfaction surveys conducted by Corporate Research Services for Bay Ferries, the desirability of lowering prices was identified by 24 percent of the surveyed population on the *Cat*.

It is noted that these remarks are being made by individuals who have chosen to travel on the services and do not include sentiments of those who have chosen not to travel because of the rates. While no known research is available on what might be termed "discouraged travellers", substantive anecdotal information has been gathered by the consulting team over the past few years that suggests rates for both services are discouraging travel.

Bay Ferries has been active in working with tour operators and accommodation owners to package the region as an attractive vacation destination. Until recently, efforts were targeted at US visitors to Canada but lately the company has been directing some efforts towards the Halifax market as well.

4.2.2.5.4 Time and Cost Savings of the Ferry Relative to Alternatives

For passenger-related traffic, reducing the amount of driving and saving time are cited as primary reasons for taking the Bay of Fundy ferry services.

As noted above, billions of dollars of highway improvements have been made in Nova Scotia and New Brunswick within the past 10-15 years that have lessened both the time and distance advantages of the ferry services. Additional improvements are planned for New Brunswick's Route 1 and the 100-series highways in Nova Scotia over the next few years. The Province of New Brunswick has recently announced the Route 1 Gateway Project in partnership with the Government of Canada. This project involves upgrading Route 1 between the US border at St. Stephen and Saint John to a 4-lane, divided highway by 2013 which will improve access between the United States and the Digby-Saint John ferry. New highway upgrades and upgrades of existing infrastructure on this project running from St. Stephen to just east of Sussex will involve over $400 million in expenditures.

These upgrades will tend to favour highway travel and the Digby ferry over the Yarmouth ferry, since they will reduce the time it take to reach the Digby-Saint John ferry.

4.2.2.6 Planned Projects

4.2.2.6.1 Vessels

Bay Ferries, which owns the *Cat*, believes that particular vessel provides the best solution for the Yarmouth crossings for the near to medium term. The company reviews its fleet requirements on an ongoing basis.

The *Cat* is equipped with a state-of-the-art Marine Dynamics ride control system. Short of replacing of the *Cat* with a more sea kindly vessel, no changes in ride characteristics are likely.

4.2.2.6.2 User Charges

User charges for the Yarmouth-Maine ferry services were unchanged in 2009 compared to 2008. Despite wide fluctuations in the price of petroleum, fuel surcharges have not been changed since 2006. Passenger surveys have indicated stable, if not slightly increasing satisfaction, with "value received for price paid" on each of the services.

Bay Ferries also note that several "value propositions" are being have been offered in the form of package deals. For instance, ferry travel and accommodation packages are available on the *Cat*.

Future fares will be established in consultation with stakeholders and government bodies who are currently providing operating and capital contributions.

4.2.2.6.3 Time and Cost Savings

Using the existing fleet and schedule there is no scope to reduce ferry crossing times or operating costs.

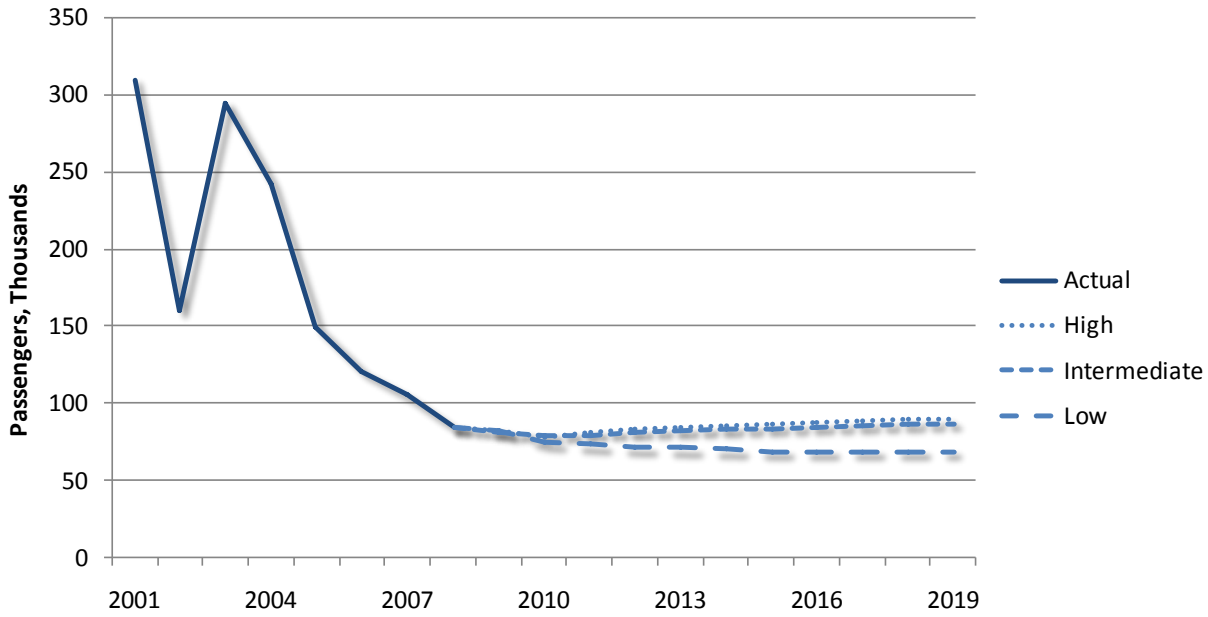
4.2.2.6.4 Schedule and Frequency of Ferry Services

Bay Ferries has noted that the fact the *Cat* has not been in Bar Harbor on weekends has affected walk-on traffic and the company is considering options to address this issue. In addition, the overall capacity of Yarmouth ferry traffic has been impacted by the inclusion of Portland as a port of call. Given the length of the crossing from Portland to Yarmouth, it is only possible to do a single round trip daily compared to a twice per day capability from Bar Harbor.

4.2.2.7 Forecast

Figure 4-24 and Figure 4-25 present forecast passenger and PRV demand for the Yarmouth-Maine ferry services over the next 10 years. This forecast was prepared based on discussions with the service operator as well as local tourism officials. It assumes that the current schedule will be maintained over the forecast period. Detailed forecasts are included in Appendix B.

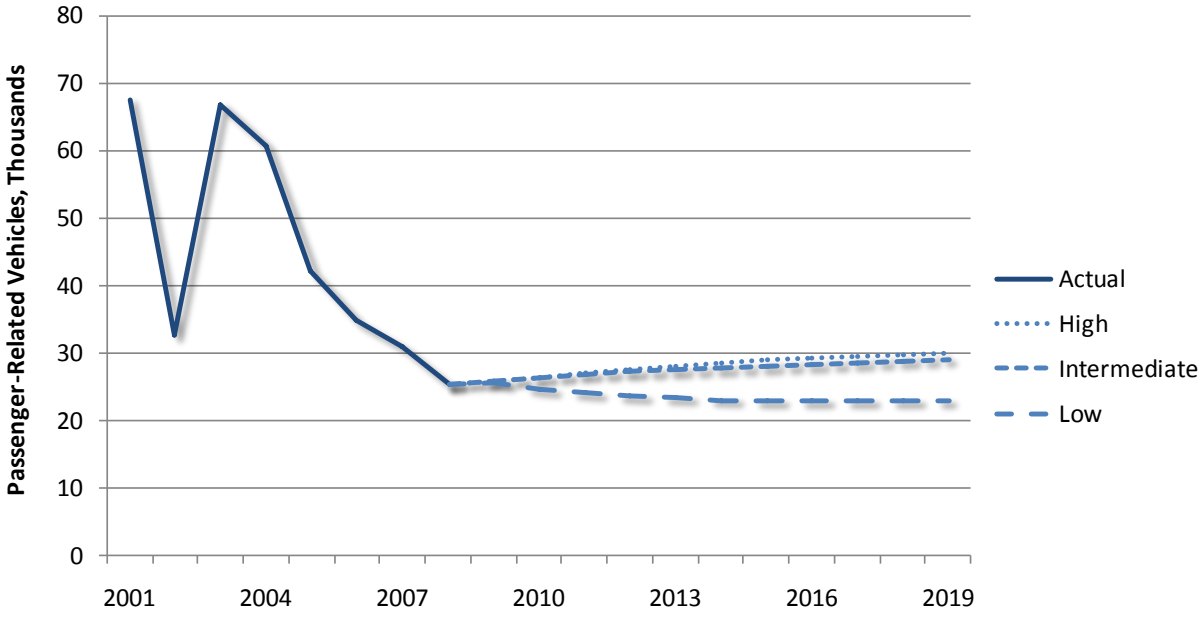
Figure 4-24: Yarmouth-Maine Ferry Passenger Traffic Forecast, 2010-2019



For the most probable scenario, for both passengers and PRVs growth of 3.0 percent is anticipated in 2010, followed by 2.0 percent in 2011, and 1.0 percent in subsequent years. It is believed that growth will be attributed primarily to new travel promotions and package deals

that are currently being marketed by the operator.

Figure 4-25: Yarmouth-Maine Ferry Passenger-Related Vehicle Traffic Forecast, 2010-2019



It should be noted that the impacts of these efforts were being experienced in the fall of 2009. For instance September 2009 traffic was modestly higher than September 2008 traffic. Demand will likely be further stimulated as the uncertainties and confusion surrounding the recently implemented passport and security requirements become resolved.

A pessimistic forecast scenario envisages a continuation of traffic declines for the next six years with no change anticipated thereafter. While considered to have a low likelihood of occurrence, it is conceivable in the event that the negative factors influencing American automobile tourism to Canada, such as high fuel prices, a high Canadian to US dollar exchange rate, and cross border security issues continue unabated.

An optimistic traffic forecast scenario has also been prepared. In the short term, slightly more positive annual traffic levels would result from increased marketing efforts and a return to less volatile economic and energy environments. Annual growth of 1.0 percent would occur in the 2016 to 2019 period.

In terms of commercial traffic, the *Cat* can carry only a limited number of trucks due its operational weight restrictions. In 2009, it is estimated that commercial movements will total approximately 140 commercial vehicles. This level is expected to be maintained over the forecast period for all forecast scenarios.

4.2.2.8 Suitability for Serving Current and Forecast Traffic Flows

Based on an assessment of travel demand factors the consulting team has prepared traffic forecasts which contemplate modest levels of growth from current traffic levels.

Suitable capacity is available using the current vessel and schedule for the Yarmouth-Maine ferry service. Bay Ferries has noted that it could increase the number of trips by the *Cat* by a single crossing per day under the following scenario; sailing from Yarmouth to Portland, Portland to Yarmouth and then Yarmouth to Bar Harbor. This capacity increase could be enacted if demand increases.

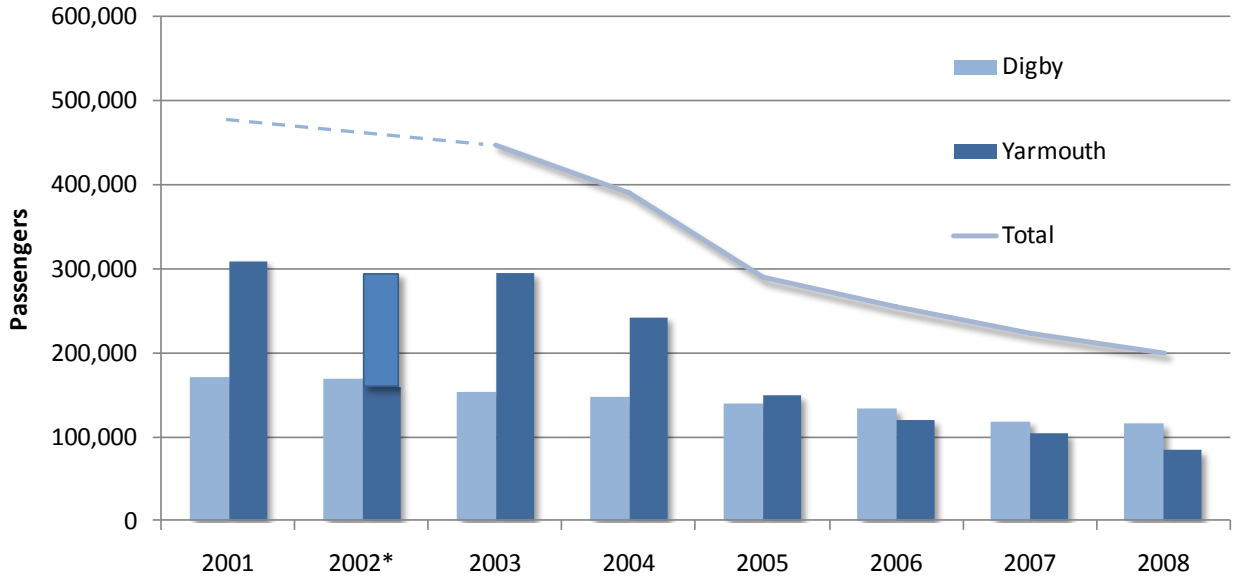
4.2.3 The Impact of Energy Prices on the Future Demand for Ferry Services

Fuel prices are a significant component of total costs for all modes. As a consequence, discretionary travel of all forms will be affected by changes in fuel costs. Inter-modal comparisons will need to made however in order to assess the impact of fuel costs on the demand for ferry services.

Fuel costs for ferry services range from 20 to 30 percent of total operating costs. The lower portion of the range is experienced by conventional displacement vessels while high speed vessels are at the upper end of the range. For both passenger and commercial vehicles, fuel costs are approximately 20 percent of operating costs depending on assumptions concerning utilization. The quantum leap in energy prices experienced in the 2007/2008 period, for instance, would tend to be neutral in terms of highway-vehicles/conventional displacement vessel comparisons i.e. the Digby-Saint John ferry service situation. For highway vehicles/high speed vessel comparisons higher fuel prices would tend to be in favour of highway vehicles.

4.2.4 Perspective on the Relative Performance of the Digby and Yarmouth Ferry Services

Figure 4-26: Total Passenger Traffic on Digby and Yarmouth Ferry Services, 2001-2008



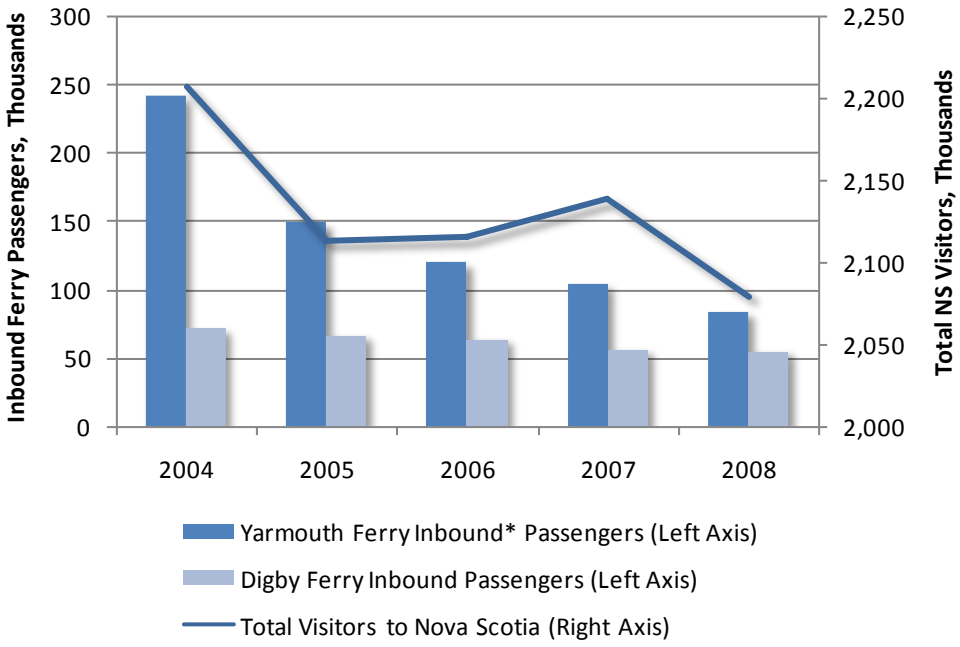
Source: Bay Ferries Ltd. and Scotia Prince Cruises
Note: *Bay Ferries only in 2002. Scotia Prince Cruises and Bay Ferries in 2001. Dotted lines and outline column reflect estimated value based on linear interpolation.

Overall ferry traffic in SWNS has declined in recent years. The declines in passenger traffic on the Yarmouth routes have been far more rapid than on the Digby-Saint John ferry. From 2001

to 2008 passenger traffic on the Yarmouth services fell by 73 percent, while passenger traffic on the Digby ferry was down by 32 percent over the same period.

This decline can be viewed in relation to the trend in tourism visitation to the province. The figure below shows visitors to Nova Scotia compared with inbound passenger volumes for the period 2004-2008. It is clear, however, that a fundamental change has taken place in the ferry business in SWNS as well as in industries which are dependent upon it, such as tourism and the fishery.

Figure 4-27: Visitors to Nova Scotia and Inbound Ferry Passengers, 2004-2008

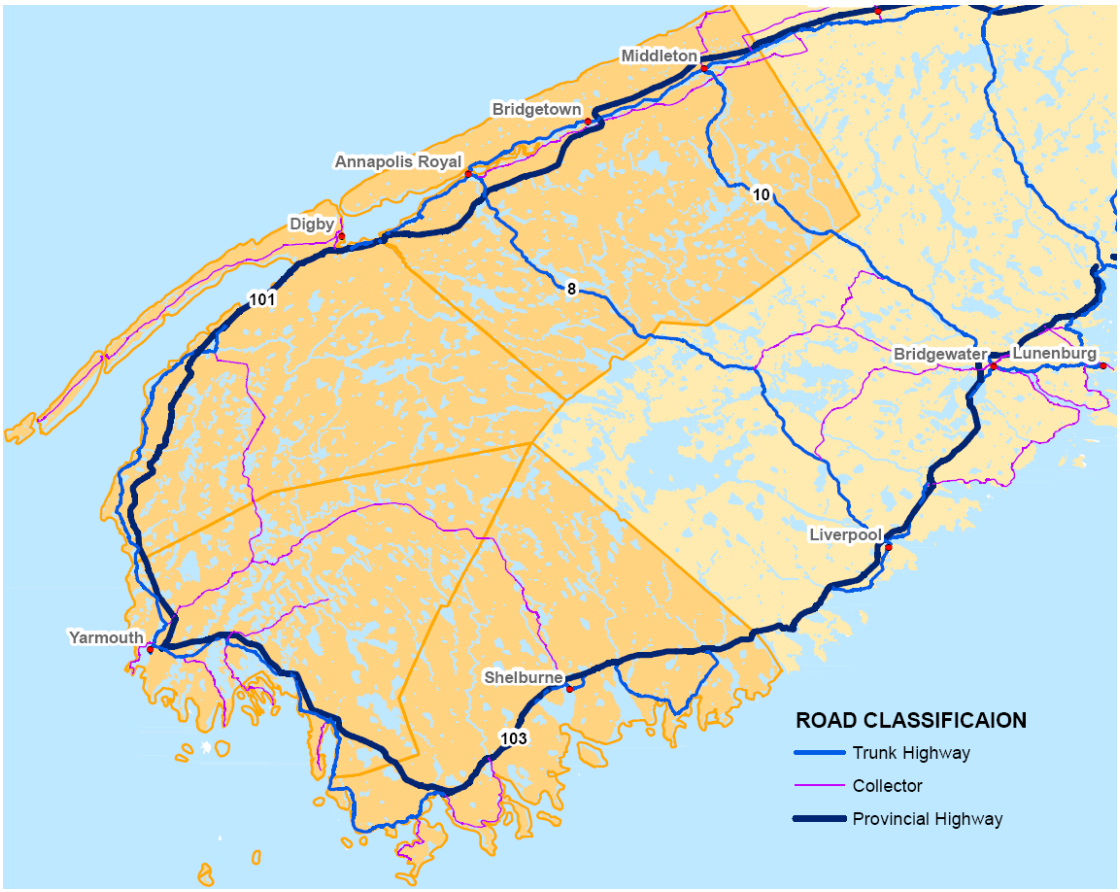


Source: CPCS analysis of data from Nova Scotia Tourism and Culture, Research and Statistics
Note: *2004 includes Scotia Prince and Cat, later years Cat only. Includes inbound and day cruise passengers.

4.3 Road Infrastructure

Key components of SWNS's highway network are depicted in figure below.

Figure 4-28: Highway Network in SWNS



Source: Opus

4.3.1 Existing Infrastructure

The highway network in SWNS consists of four distinct roadway classes: provincial arterials, trunk highways, collector highways, and local roads (Note: this differs slightly from NSTIR's road classification system which references freeways, arterials, collectors, and local roads). These four classes collectively total 4,568 kilometres of road within the study area, as shown in the figure below.

Figure 4-29: Breakdown of Highway Network by Road Classification, Kilometres

Highway 101 Segments	Provincial Arterials	Trunk Highways	Collector Highways	Local Roads
Annapolis County	76	172	76	1,029
Digby County	86	64	110	918
Yarmouth County	70	75	155	898
Shelburne County	74	81	78	604
Total	306	392	420	3,450

The 100-series highways (listed as provincial arterials in the figure above) are arguably the most critical component of the highway network in SWNS, carrying the highest volumes of traffic and ultimately connecting the region with the rest of North America. For this reason, much of the analysis and discussion contained in this section are focused on Highway 101 and Highway 103 – the two 100-series highway in the study area.

4.3.1.1 Highway 101

Highway 101 is the primary arterial along Nova Scotia's northwest coast, extending approximately 300 km between Bedford and Yarmouth. It is generally two-lane controlled access with a speed limit of 100 km/h. However, considerable progress has been made in recent years towards twinning some of the higher volume sections located in close proximity to the Halifax Regional Municipality. As a result, a continuous four-lane divided section now extends from Bedford to St. Croix (at Exit 4). The entire length of Highway 101 is controlled access, with the exception of a 23-km stretch between Digby and Weymouth.

Approximately 180 kilometres of Highway 101 are located inside the study area – all of which have a two-lane cross section (i.e. one lane of traffic in each direction). There are approximately 30 passing lanes (both directions) along this section. As shown in Figure 4-30, traffic volumes within the study area range from approximately 1,700 to 7,800 vehicles per day. The largest volumes are located near Digby.

Figure 4-30: Highway 101 Annual Average Daily Traffic Volumes (AADT)

Highway 101 Segments	Length (km)	AADT (veh / day)
Exit 18A (Victoria Rd.) to Exit 18 (Brooklyn Rd.)	3.4	3,830
Exit 18 (Brooklyn Rd.) to Exit 19 (Lawrencetown)	8.5	4,060
Exit 19 (Lawrencetown) to Exit 20 (Bridgetown)	11.1	3,830
Exit 20 (Bridgetown) to Exit 21 (Rice Rd)	4.7	2,380
Exit 21 (Rice Rd) to Exit 22 (Annapolis Royal)	21.3	2,570
Exit 22 (Annapolis Royal) to Exit 23A (Mary Jane Riley Rd.)	14.0	2,970
Exit 23A (Mary Jane Riley Rd.) to Exit 23 (Deep Brook)	5.2	2,840
Exit 23 (Deep Brook) to Exit 24 (Smith's Cove)	1.6	5,970
Exit 24 (Smith's Cove) to Exit 25 (Joggin Bridge)	4.6	5,990
Exit 25 (Joggin Bridge) to Exit 26 (Digby)	2.7	7,800
Exit 26 (Digby) to Exit 27 (Weymouth North)	16.1	6,030
Exit 27 (Weymouth North) to Exit 28 (St. Bernard)	6.5	2,220
Exit 28 (St. Bernard) to Exit 29 (Little Brook)	14.9	1,960
Exit 29 (Little Brook) to Exit 31 (Meteghan)	15.5	1,660
Exit 31 (Meteghan) to Exit 32 (Hectanooga Rd.)	12.2	2,550
Exit 32 (Hectanooga Rd.) to Exit 33 (Richmond Rd.)	8.5	2,590
Exit 33 (Richmond Rd.) to Exit 34 (Hebron)	10.0	2,900

Source: NSTIR

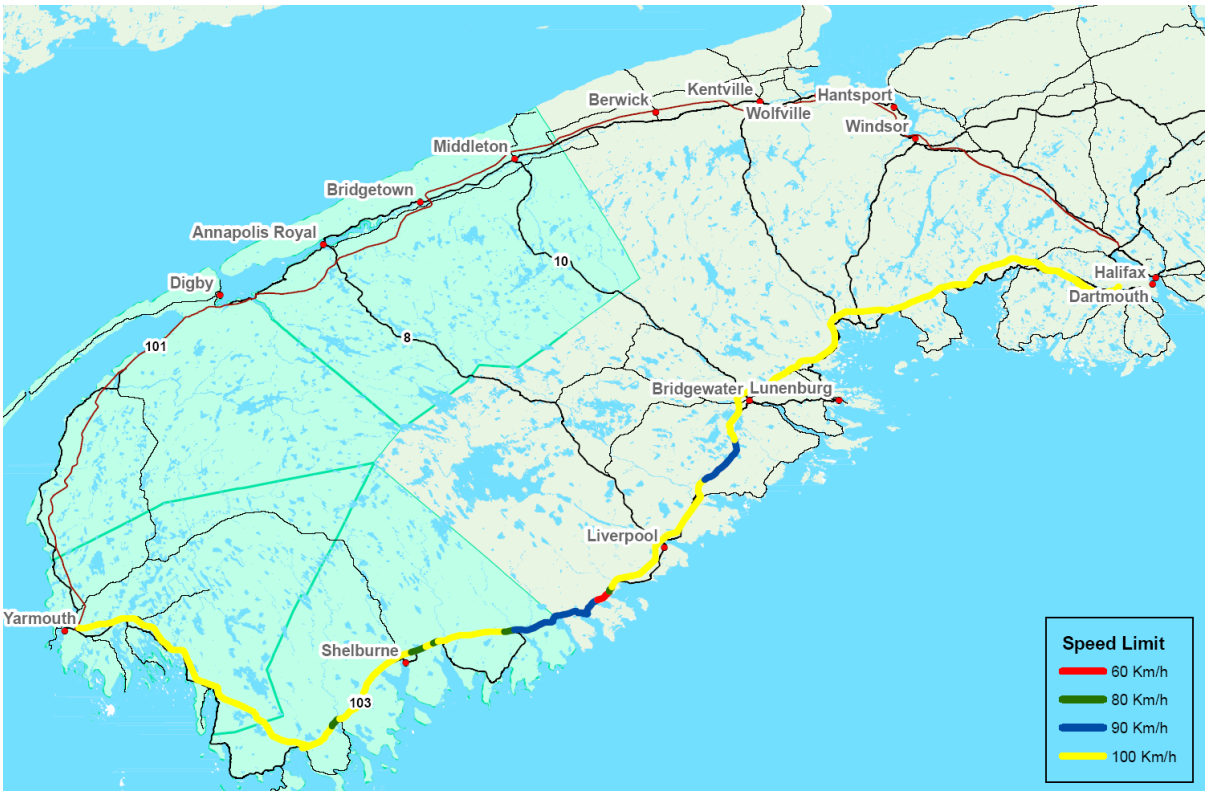
4.3.1.2 Highway 103

Highway 103 is the primary arterial along Nova Scotia's southwest coast, extending approximately 300 km between Yarmouth and Halifax. It is generally 2-lane with varying degrees of access control. Like Highway 101, progress has been made on twinning some of the higher volume sections of Highway 103 located near the Halifax Regional Municipality. A continuous 4-lane section currently exists from Halifax to the Upper Tantallon area. The only other 4-lane section on Highway 103 is a 3 km stretch located near Chester.

Compared to Highway 101, a much greater portion of Highway 103 is uncontrolled access. This is because there are still several remaining sections of Trunk 3 that have yet to be bypassed by Highway 103, including sections near Port Clyde, Port Mouton, and Italy Cross. Posted speed limits on Highway 103 range from 60 to 100 km/h, as depicted in Figure 4-31. Not surprisingly, the lower speed limits coincide with sections where access is currently uncontrolled.

Figure 4-32 depicts traffic volumes along Highway 103 within the study area. As shown, volumes range from approximately 1,800 (near Pubnico) to 5,200 vehicles per day (in Yarmouth).

Figure 4-31: Speed Limits on Highway 103



Source: Opus

Figure 4-32: Highway 103 Annual Average Daily Traffic Volumes (AADT)

Highway 103 Segments	Length (km)	AADT (veh / day)
Exit 23 (Sable River) to Exit 24 (Jordan Falls)	13.7	2,000
Exit 24 (Jordan Falls) to Exit 25 (Shelburne Bypass E)	5.7	3,000
Exit 25 (Shelburne Bypass E) to Exit 26 (Ohio Rd.)	4.0	2,140
Exit 26 (Ohio Rd.) to Exit 27 (Birchtown)	6.9	2,680
Exit 27 (Birchtown) to Exit 28 (Clyde River)	13.4	2,730
Exit 28 (Clyde River) to Exit 29 (East of Barrington)	11.0	3,410
Exit 30 to Exit 31 (Pubnico)	17.8	1,770
Exit 31 (Pubnico) to Exit 32 (Argyle Causeway E)	12.6	3,180
Exit 32 (Argyle Causeway E) to Exit 32A (Argyle Causeway W)	1.4	3,920
Exit 32A (Argyle Causeway W) to Exit 33 (Tusket)	11.8	3,390
Exit 33 (Tusket) to Hardscratch Rd (Yarmouth)	10.2	5,150

Source: NSTIR

4.3.1.3 Trunk Highways

There are 392 km of trunk highways within the study area including Trunk 1, Trunk 3, Trunk 8, and Trunk 10.

- Trunk 1 extends through communities along Nova Scotia's northwest coast including Middleton, Bridgetown, Annapolis Royal, Digby, and Weymouth. It effectively parallels Highway 101.
- Trunk 3 extends through communities along Nova Scotia's southwest coast including Argyle, Barrington, Shelburne, and Lockeport. It effectively parallels Highway 103.
- Trunk 8 runs north-south, connecting Highway 101 and Highway 103. It extends 91 km between Annapolis Royal and Liverpool and serves as the primary route to and from Kejimkujik National Park.
- Trunk 10 runs north-south as well, extending 89 km between Middleton and Bridgewater.

Speed limits on the trunk highway system vary from 50 to 90 km/h, depending largely on the nature of adjacent roadside development. Traffic volumes on these roads are presented in Figure 4-33.

Figure 4-33: Trunk Highway Annual Average Daily Traffic Volumes (AADT)

Highway	Segment	AADT (veh / day)
Trunk 1	Wilmot to Brickton-Middleton Line	5,100 to 7,600
	Brickton-Middleton Line to Deep Brook	1,720 to 3,280
	Weymouth North to Hebron	1,160 to 3,600
	Hebron to Yarmouth	6,610 to 7,450
Trunk 3	Sable River to Birchtown	360 to 1,920
	Shag Harbour to Arcadia	950 to 1,990
	Starrs Road (Yarmouth)	17,900
Trunk 8	Between Trunk 1 and Route 201	4,780
	Between Route 201 and Highway 101	1,430
	Between Highway 101 and Maitland Bridge	750
Trunk 10	Between Trunk 1 and Route 201 (Nictaux)	2,670
	Between Route 201 (Nictaux) and Springfield	700

Source: NSTIR

Truck traffic accounts for a considerable portion of the volumes contained in the previous figures. Figure 4-34 presents the average annual daily truck traffic (AADTT) on each route, as estimated using vehicle classification counts conducted by NSTIR. As shown, truck volumes on the 100-series highways range from approximately 200 to 400 trucks per day.

Figure 4-34: Study Area Truck Volumes

Route	AADTT
Highway 101	180 - 400
Highway 103	200 - 300
Route 303	50
Trunk 8	120
Trunk 10	50-80

Source: Opus analysis of data from NSTIR

The data readily indicate that the biggest flows are on Highway 101 followed by 103. Yarmouth is virtually equidistant to Halifax via either route, so exports moving over the road originating from Barrington eastwards would tend to move via 103 while product in Meteghan / Brier Island / Digby would tend to move via 101 if it did not take the ferry.

The Government of Nova Scotia's road improvement strategy has been to bypass higher volume trunk roads with controlled access 100-series highways designed for through traffic travelling at high speeds. For example, Highway 101 bypasses section of Trunk 1 and Highway 103 bypasses sections of Trunk 3. The traffic remaining on the trunk roads is predominately local traffic travelling at lower speeds using the highway system for access.

4.3.1.4 Collector Highways

There are 420 km of collector highways within the study area. Route 303 is arguably the most significant in terms of its role within the overall transportation system, as it provides the only access between Highway 101 (and points beyond) and the Digby-Saint John ferry service. For this reason, it has been designated part of Canada's National Highway System.[49] Traffic volumes on Route 303 between Highway 101 and the Digby town limit are approximately 11,000 vehicles per day. This volume drops to approximately 850 vehicles per day between the town limit and the ferry terminal.

4.3.2 Current Issues

Sections 4.3.2.1 to 4.3.2.4 describe issues with the existing road network as identified through stakeholder consultations undertaken to date and supplemented with site visits completed by members of the study team. The majority of issues presented in the following sections deal with components of the road network located within the study area. However, some issues were identified outside of the study area that also have a direct impact on transportation to and from SWNS.

4.3.2.1 Access Control Issues

4.3.2.1.1 Digby to Weymouth Bypass

As previously mentioned, the 23-km section between Digby and Weymouth is the last remaining stretch of Trunk 1 yet to be bypassed by Highway 101. Consequently, there are a relatively high number of driveways and other roadside accesses along this stretch which increase the potential for vehicle conflicts and thus have an unfavourable impact on safety. As a result, this section has a posted speed limit of 90 km/h – making it the only section on Highway 101 with a posted speed limit less than 100 km/h.

[49] The National Highway System (NHS) is a designated set of highways in Canada that supports national interests. To be included in the NHS, a highway must fall into one of the following three categories:

- **Core Routes** – key interprovincial and international corridor routes
- **Feeder Routes** – key linkages to the core routes from population and economic centres (including links to intermodal facilities and significant border crossings).
- **Northern & Remote Routes** – key linkages to core and feeder routes that serve as the primary access to northern or remote communities.

In Canada, highways are the responsibility of provincial governments. However, the federal government does provide funding on a cost-shared basis for highways in the NHS because their strategic role in supporting national interests.

Components of the NHS within the study area include:

- Highway 101 (Core Route);
- Highway 303 (Core Route);
- Highway 103 (Feeder Route); and
- Hardscratch Road, Starrs Road, Highway 1, and Highway 3 in Yarmouth (Core Route).

Figure 4-35: Typical Roadside Development on Highway 101 between Digby and Weymouth

Source: CPCS

Traffic volumes on the Digby-Weymouth section are also considerably higher than on adjacent sections of Highway 101, as there is no alternative route available for local traffic. The high volumes and lower speed limit have a negative impact on transportation efficiency.

4.3.2.1.2 Uncontrolled Access on Highway 103

Similar to the Digby-Weymouth section on Highway 101, there are several sections on Highway 103 where access control is an issue. Perhaps the most notable locations are from Sable River (Exit 23) to Summerville Centre (Exit 20) and between the Barrington Bypass and Birchtown (Exit 27). Speed limits on these sections are reduced to 60 km/h and 80 km/h respectively, as a consequence of the limited access control. While uncontrolled access has an unfavourable impact on safety, the lower speed zones also reduce the efficiency of travel on the Highway 103 corridor.

4.3.2.2 Connectivity Issues

4.3.2.2.1 Highway 101 / Highway 103 Connection

Highway 101 and Highway 103 are the most critical components of the road transportation system in SWNS, essentially forming a loop between Yarmouth and Halifax. However, there is no direct connection between these two 100-series highways in Yarmouth itself. The current routing requires drivers to travel approximately 600 m on Starrs Road and 700 m on Hardscratch Road to make the connection. This is particularly inconvenient given that Starrs Road is lined with large retail developments that make traffic flow somewhat congested at times. As a result, the provision of a high speed connector between Highway 101 and Highway 103 has been identified as a long term need for the region.

Figure 4-36: Retail Development on Starrs Road

Source: CPCS

It should be recognized that existing demand for trips directly between Highway 101 and Highway 103 is quite low. The 2008 Yarmouth Area Transportation Study[50] estimated that a direct connection would have an AADT of about 250 vehicles per day. However, the study also notes that these volumes could potentially be higher depending on future industrial development at the Hebron Industrial Park.

4.3.2.2.2 NHS Designation of Truck Route to the Port of Yarmouth

The following route segments are designated as part of Canada's National Highway System (NHS) as feeder routes because they connect the 100-series highways with the Port of Yarmouth:

- Hardscratch Road - between Highway 103 and Starrs Road;
- Starrs Road - between Hardscratch Road and Main Street (Trunk 1); and
- Main Street - between Starrs Road and Hueston Street.

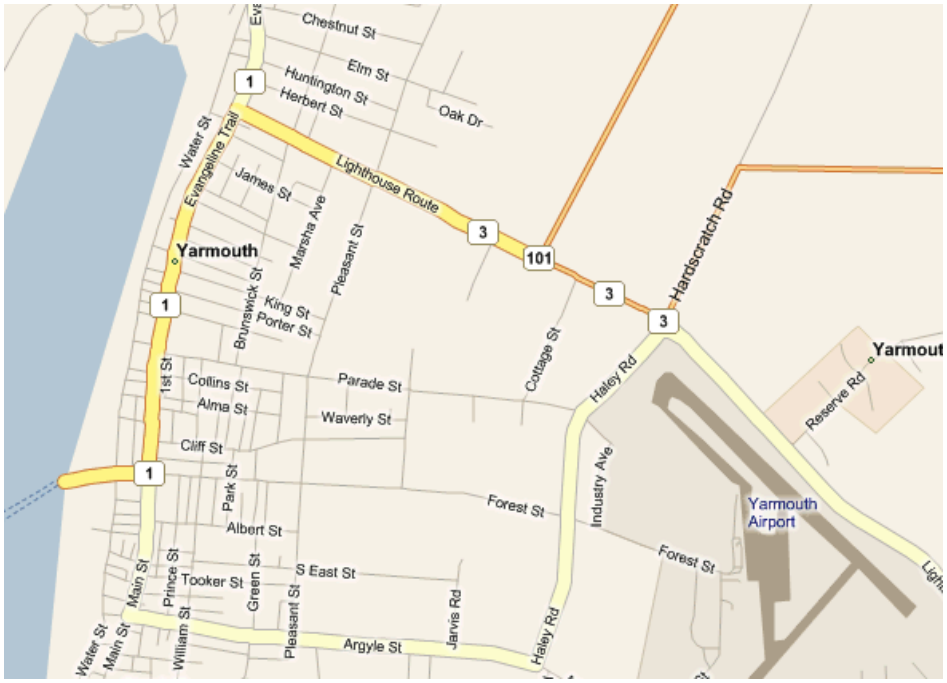
This routing passes through much of Yarmouth's central business district and retail area, making it ideal for maximizing expenditures from tourist traffic. However, the roadway and intersection geometry, combined with high traffic volumes, make this routing less than desirable for truck traffic.

The majority of trucks currently access the port via Haley Road and Argyle Street. The aforementioned Yarmouth Transportation Study recommends that this truck route should also be considered for inclusion as part of the NHS, thus making it eligible for future federal funding contributions.

Figure 4-37 depicts both the NHS route and the existing truck route between the 100-series highways and the Port of Yarmouth.

[50] Atlantic Road & Traffic Management, "Yarmouth Area Transportation Study", 2008.

Figure 4-37: Routing to the Port of Yarmouth



Source: Google Maps

It is recognized that there is currently limited demand for truck access into the Port of Yarmouth. The *Cat* carries less than 150 commercial vehicles (motorcoaches, actually) per year and there are few other major generators of truck traffic at the port. However, there is potential for demand to increase depending on the future service capability of Yarmouth ferry services.

4.3.2.2.3 Secondary Access to Digby

Route 303 is the only access from Highway 101 to the Town of Digby. As such, traffic volumes between Highway 101 and the town limit are quite high at approximately 11,000 vehicles per day. This reduces efficiency for all through traffic movements destined for the ferry service to Saint John. As a result, there has been some discussion about the need for a secondary access into the town to provide a less congested route for through traffic. This secondary access would also provide an alternative for other road users (including emergency response vehicles) in the event of a road closure on Route 303.

4.3.2.3 Maintenance of Existing Infrastructure

4.3.2.3.1 Aging Structures

Much of the 100-series highway network through Annapolis, Digby, Yarmouth, and Shelburne counties was built in the 1980s and 1990s. This means that many of the structures along Highways 101 and 103 are approaching 30 years of age. The typical design life of a structure is 50 years. Therefore, within the next 20 years, the Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) will be faced with some costs for the rehabilitation / replacement of these structures.

4.3.2.3.2 Pavement Rehabilitation

As presented in Figure 4-29, there are over 4,500 km of roads within the study area. The funds required to maintain this infrastructure account for a portion of NSTIR's operating budget. These maintenance costs are expected to increase as the infrastructure continues to age. Given provincial budgetary constraints, funds available for capital projects may be reduced in the future. The four provincial governments in Atlantic Canada have identified highway rehabilitation as the region's biggest challenge:

> The most pressing need at this time is the region's strategic highways and needed rehabilitation funding to restore them to their design service levels. All across Canada, rehabilitation requirements are outstripping current sources of funding. [51]

4.3.2.4 Issues Outside of the Study Area

4.3.2.4.1 Cobequid Pass Reliability

One of the most desired attributes of a transportation system is reliability. For this reason, many stakeholders have identified the Cobequid Pass toll section on Highway 104 as an issue due to uncertainties surrounding its potential closure during the winter months. This section of road has a history of experiencing extreme weather conditions that sometimes result in complete closure of Highway 104. Such an occurrence can be particularly devastating for time sensitive shipments such as fresh seafood, for which freshness is the key determinant of market value. However, it should be noted that insufficient data is available to assess whether the Copequid Pass does in fact close more frequently than other sections of highway in the province.

While the reliability of the Cobequid Pass has been raised as an issue, it should be noted the Digby-Saint John ferry service is also susceptible to cancellation due to extreme weather conditions.

4.3.3 Planned Projects

There are few roadway capital projects scheduled for the study area over the short term. Improvements to Highways 101 and 103 continue to be focused on sections with larger traffic volumes located closer to the Halifax Regional Municipality. However, it should be noted that any upgrades along Highway 101 or 103 do provide a benefit to road users in SWNS by means of improved connectivity. Planned road infrastructure projects (both short and long term) within the study area are described below, including timelines for completion and funding status.

4.3.3.1 Hectanooga Road Interchange

The previous at-grade intersection at Highway 101 and Hectanooga Road is currently being converted to a full grade separated interchange. The new interchange is scheduled to be completed in the spring of 2010. This project is expected to result in improved safety.

[51] "Charting the Course: Atlantic Canada Transportation Strategy, 2008 – 2018", p. 19.

4.3.3.2 Digby-Weymouth Bypass

A considerable amount of planning work has been undertaken for the Digby-Weymouth Bypass. A corridor for the new highway has been identified for quite some time and an environmental impact assessment was completed in 2003. NSTIR has also begun to acquire properties along the proposed corridor. However, there are currently no funds allocated to this project, which has an estimated cost of $100 million.

4.3.3.3 Highway 101 / Highway 103 connection

The connection of Highway 101 and Highway 103 was identified as a long term need in the Yarmouth Area Transportation Study. The corridor for this high speed connector has been identified, and properties are gradually being purchased by NSTIR as they become available. However, no funding has been allocated to this project.

4.3.3.4 Port Mouton Bypass

In April 2009, the Province announced plans to construct an 8 km controlled access section of Highway 103 to bypass the existing Trunk 3 through the communities of Port Mouton and Port Joli. The cost of this project, which is scheduled to take two years to complete beginning in 2011, is an estimated $33 million.[52] Although this project is located outside of the study area, it will have a positive impact on the local economy by improving efficiency on the Highway 103 corridor. At 60 km/h, this section has the lowest posted speed on Highway 103.

4.3.3.5 Highway 103 Access Control

NSTIR has identified an 80 km section of Highway 103 for upgrades to access control. However, the timeline for potential upgrades is considered to be long term.

4.3.3.6 Route 303 Upgrades

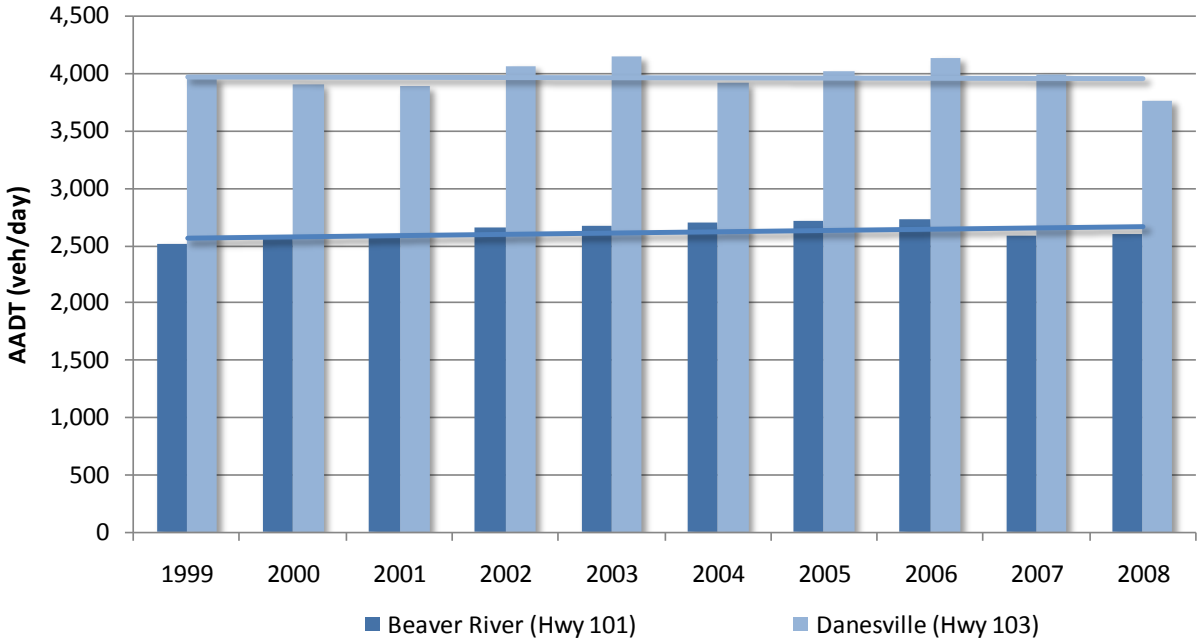
Plans are underway to widen Route 303 between Highway 101 and the Digby town limit. A two-way-left-turn lane will also be installed to improve access to roadside development.

4.3.4 Traffic Forecast

Figure 4-38 depicts historical traffic volumes at the two permanent traffic count stations located on the 100-series highways within the study area. One counter is located on Highway 101 at Beaver River and the other on Highway 103 in Danesville. Over the 10-year period between 1999 and 2008, traffic at Beaver River has increased at a modest rate of 0.4% annually. Meanwhile, traffic in Danesville has exhibited zero growth over this same period.

[52] http://queenscountytimes.ca/highway portjoli/index.html, accessed November 30, 2009.

Figure 4-38: Historical Road Traffic Growth in the Study Area



Based on the above observations, traffic in the region is expected to grow at a modest annual rate of 0 to 1.0 percent over the next ten years. For the purposes of this study, annual growth of 1.0 percent was selected to evaluate existing infrastructure capacity in the study area. Figure 4-39 depicts the additional traffic that can be expected on key routes in the year 2019 assuming one percent annual growth. As shown, the anticipated scenario will result in an additional 200 to 400 vehicles per day on both Highways 101 and 103 by 2019. Trunk 8 and Trunk 10 will see an additional 80 vehicles per day by 2019, while Route 303 will see an additional 90 vehicles per day.

Figure 4-39: Additional Traffic Forecast on Key Routes (2019)

Route	Additional AADT
Highway 101	200 - 400
Highway 103	200 - 400
Route 303	90
Trunk 8	80
Trunk 10	80

4.3.5 Suitability for Serving Current and Forecast Traffic Flows

Generally speaking, the existing road network adequately serves the needs of road users in SWNS. This section assesses the suitability of the existing road network in terms of capacity, safety, and connectivity.

4.3.5.1 Capacity

The capacity of a roadway can be described as the volume of traffic it can accommodate while providing an acceptable level of service to road users. Level of service (LOS) is defined in the *Highway Capacity Manual* as:

> A qualitative measure describing operational conditions within a traffic stream, based on service measurements such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort, and convenience. [53]

A Class I two-lane arterial highway can generally accommodate an AADT of approximately 4,700 to 7,000 vehicles per day while maintaining an acceptable level of service. This capacity is increased to approximately 5,600 to 8,400 vehicles per day on a Class II two-lane arterial – where driver expectations with respect to travel speeds are slightly lower (see the Appendix C for the methodology used to calculate these volumes). Highway 101, Highway 103, Trunk 8, and Trunk 10 are considered to be Class I arterials, while Trunk 1 and Trunk 3 are Class II arterials. By comparing existing volumes to the available capacity on each road, it is evident that the existing highway network has more than adequate capacity to handle both current and future traffic demand.

4.3.5.2 Safety

Collision rates are a commonly used measure of highway safety. Figure 4-40 presents historical collision rates for sections of Highway 101 and Highway 103 within the study area and provides a comparison with two other similar sections of the 100-series highway network in Nova Scotia. Rates are expressed in terms of collisions per hundred-million-vehicle-kilometres travelled (HMVK). As shown, the total rates for Highways 101 and 103 are similar at 35.9 and 36.3 collision per HMVK respectively. These rates are lower than those observed for similar sections on Highways 104 and 105.

Figure 4-40: Historical Collision Rates on 100-series Highway Segments (per HMVK)

Highway Segment	PDO*	Injury	Fatality	Total
Hwy 101 - Victoria Rd Inter/c to Yarmouth	25.3	10.0	0.6	35.9
Hwy 103 - Sable River Inter/s to Yarmouth	24.2	11.4	0.7	36.3
Hwy 104 - Sutherlands River to St. Peter's	24.8	12.0	0.8	37.6
Hwy 105 - Canso Causeway to North Sydney	21.0	15.5	0.8	37.2

* PDO = Property Damage Only
Source: NSTIR Collision Rate Book

Although total collision rates on Highways 101 and 103 compare favourably with similar road sections, a more detailed review of the collision data revealed that the section of Highway 101 between Digby and Weymouth has a particularly high incidence of severe collisions. The annual rates of injury and fatal collisions on this section were 15.9 and 1.0 collisions per HMVK, respectively – well above the average for the study area. High traffic volumes and uncontrolled access are likely the most important contributing factors.

[53] Transportation Research Board, "Highway Capacity Manual", 2000.

4.3.5.3 Connectivity and Efficiency

The 100-series highway network provides efficient connections from the region to the Halifax Regional Municipality, the Trans-Canada Highway, and the ferry services between Digby and Saint John and Yarmouth, Portland and Bar Harbor.

In terms of efficiency, the only segment on Highway 101 with a posted speed limit of less than 100 km/h is between Digby and Weymouth (currently posted at 90 km/h). Increasing the speed limit on this segment would reduce the average travel time by less than 1.5 minutes. Similarly, Highway 103 has five sections currently posted between 60 km/h and 90 km/h. Assuming the speed limit on each of these sections was increased to 100 km/h, the average travel time would be reduced by approximately 5 minutes.

4.4 Regional Ports

There are three major *harbours* in the study region, Digby, Shelburne and Yarmouth, each with its own characteristics and ambitions for development. In some cases the anticipated roles and markets overlap, but in other respects they are separate and distinct. Shelburne, however, is the only commercial *port* in the study region, as neither Digby nor Yarmouth has handled any cargo recently.[54] (Note that ferry terminals, as distinct from ports, were discussed above, in Section 4.2 on the ferry system in SWNS).

4.4.1 Digby

The Digby wharf serves the town of Digby (population 2,092), the Municipality of the County of Digby (population 7,986) and Digby County (population 18,992). This facility's role is somewhat unique in that it almost exclusively serves one industry: the fishery. The wharf is a key piece of local infrastructure which allows over 100 fishers to earn a living.

Until 1996, the Digby wharf was owned and operated by the federal Department of Fisheries and Oceans. It was then transferred to Transport Canada, which then included it in its port divestiture program, which commenced with the National Marine Policy of 1995. In 1999, the Digby wharf was transferred to the Maritime Harbours Society (MHS). A contribution in the amount of $3 million was provided to the MHS to operate and maintain the port.[55]

After several years of turmoil and controversy, the Digby wharf is now owned by the Digby Harbour Port Association (DHPA), a not-for-profit society, which purchased the facility for $1.2 million from the Maritime Harbours Society in December 2007. Of this $1.2 million, $1.1 million was borrowed.

[54] Webster's Dictionary defines "port" as "a harbour town or city where ships take on or discharge cargo".
[55] In the fall of 2007, working with ACOA, the DHPA entered into an agreement with the MHS to purchase the Digby wharf for $1.2M. The DHPA raised $350,000 and ACOA provided $850,000 loan through the local Community Business Development Corporation to complete the sale. As the Digby wharf had not been properly maintained and was in poor condition, in 2009, the DHPA received $3 million from the Department of Fisheries and Oceans under the Small Craft Harbours Program to replace missing or damaged piles on the concrete breakwater.

4.4.1.1 Role in Regional Transportation System and Economy

In 2008, the Digby wharf served 87 fishing boats. Of these, 44 were scallop boats, the majority of which are based in Digby on a year round basis. The facility also served 31 lobster boats, of which six operate year round. The other 25 use the facility for 2-3 month periods in the spring and late fall fishing seasons. Six groundfish and another six aquaculture boats were also accommodated.

Many boats are corporate-owned by companies with a direct stake in the industry. O'Neill's Fisheries owns the largest fleet, with about a dozen vessels, with D.B. Kenney owning another five or six. There are several other 2-3 boat owners.

Most of the catch is loaded into trailers and sent across on the Digby-Saint John ferry to markets in Canada and the United States. In particular, fish draggers send live or fresh product to market the same day it is landed. This is considered a premium product which is dependent upon good transportation linkages.

In October 2009, the harbour hosted a 1,350-passenger cruise ship, M.V. *Balmoral*, operated by Fred Olsen Line. Passengers were brought ashore in tenders.

In the inner section of the wharf is a marina which can accommodate up to 80 pleasure boaters, including visiting yachts.

The last cargo shipped through the Digby wharf was in 1995, and consisted of a 9,600 tonne shipment of pit props.

4.4.1.2 Traffic Volume

According to a recent report for the Digby Harbour Port Association, fish and seafood landings at Digby have varied from a high of 36.0 million kilograms and a value of $34.0 million in 2003, to 5.3 million kilograms and an estimated value of $12.0 million in 2006.

4.4.1.3 Infrastructure

The Port of Digby Fisherman's Wharf provides berthage as well as unloading and loading facilities to about 87 users – the largest fishing fleet on the Nova Scotia side of the Bay of Fundy. It consists of four main sections:

- The Marginal Wharf and parking lot;
- The Old Spur Wharf;
- The Inner "L" Wharf; and
- The Spur Wharf Extension and new "L" Wharf (Outer "L")

The enclosure formed by the large wharf structure also provides shelter for an 80-berth pleasure boat marina on the inside of the small basin formed by its configuration.

Engineering analysis of the structures was undertaken as part of the "Concept Design and Ten-year Business Plan for Digby Harbour"[56], which was completed in July 2009.

Figure 4-41: Digby Harbour

Source: Digby Harbour Port Association

4.4.1.4 Current Issues

The major issue affecting Digby is the present condition of the wharf which needs repairs and investment to serve the needs of close to 90 fishers. Maintenance was neglected in the period between Transport Canada's stewardship and the present ownership which has been in place since early 2009.

In most small craft harbours in Atlantic Canada, the Small Craft Harbours program of the federal Department of Fisheries and Oceans provides facilities for local fishers. Prior to the transfer of the Digby Wharf to Transport Canada and then to the Maritime Harbours Society, the wharf was considered to be a key piece of local infrastructure. Once it was divested by Transport Canada, the owners were expected to pay for upkeep through fees generated, as well as a fund that was initially provided to MHS. According to the DHPA business plan, it is now "beyond the ability of the Digby Harbour Port Association (DHPA) to pay for infrastructure development of the magnitude required." The current situation, whereby the DHPA assumed ownership of the structure in 2007, also results in Digby fishers paying the highest fees in the region.

4.4.1.5 Planned Projects

The "Concept Design and Ten-year Business Plan for Digby Harbour" outlines a number of investments required to provide safe refuge from adverse weather, berthage, loading and

[56] Digby Harbour Port Association, "Concept Design and Ten-year Business Plan for Digby Harbour", Cormier Management Consulting and Fundy Engineering, July 9, 2009.

unloading facilities, and basic services such as access to electric power, fresh water, fuel and hoists.

The proposed projects, their timelines and costs are set out in Figure 4-42.

Figure 4-42: Proposed Digby Harbour Association projects, 2009-2014

	Project	Phase	Start	Complete	Cost ($M)
1	Breakwater	I	2009	2010	2.482
2	Breakwater & dredging	I	2009	2010	3.466
3	Demolition of Inner "L"	I	2010	2010	1.693
3a	Road and site for fuel and ice plant	I	2010	2011	3.102
4	Dredge inner harbour	I	2010	2010	3.390
5	Install floating wharves	I	2010	2011	2.445
6	Marginal wharves, infill of land, causeway and travel lift infrastructure	II	2012	2012	9.290
7	Install floating wharves inside breakwater 2	II	2012	2012	0.655
8	Dredging for new marina and 3rd set of floating wharves	II	2013	2014	3.242
9	Move marina	III	2014	2014	0.998
9a	Install floating wharves for fishing fleet	III	2014	2014	0.534
				Total	$31.297

4.4.1.6 Forecast

Digby has major infrastructure issues relating to its large base of fishing boat customers. The port has also mooted the idea of handling break-bulk refrigerated vessels, but this would depend on those vessels being able to compete on price and service quality with container carriers calling at Halifax and Saint John. Potential volumes have not yet been determined, but they would be related to the volume of the local catch. Local stakeholders have also discussed the possibility of staging tidal power projects from an enhanced wharf facility.

4.4.1.7 Suitability for Serving Current and Forecast Traffic Flows

The Digby wharf issue is not really a transportation issue. Its only connection with a traditional definition of "transportation" stems from its previous administration by Transport Canada; it was built as fishing infrastructure and administered by DFO until 1996. The existence of the wharf and its condition impacts on the ability of local fishers to earn a living and the volume of trucks using the Digby-Saint John ferry service.

4.4.2 Yarmouth

4.4.2.1 Role in Regional Transportation System and Economy

Apart from being the terminus of the Yarmouth-Maine ferry services described above, the primary function of the Port of Yarmouth is a fishing and recreational harbour. Users of the port include local fishers using the Lobster Rock terminal, and some visiting yachts, making use of a

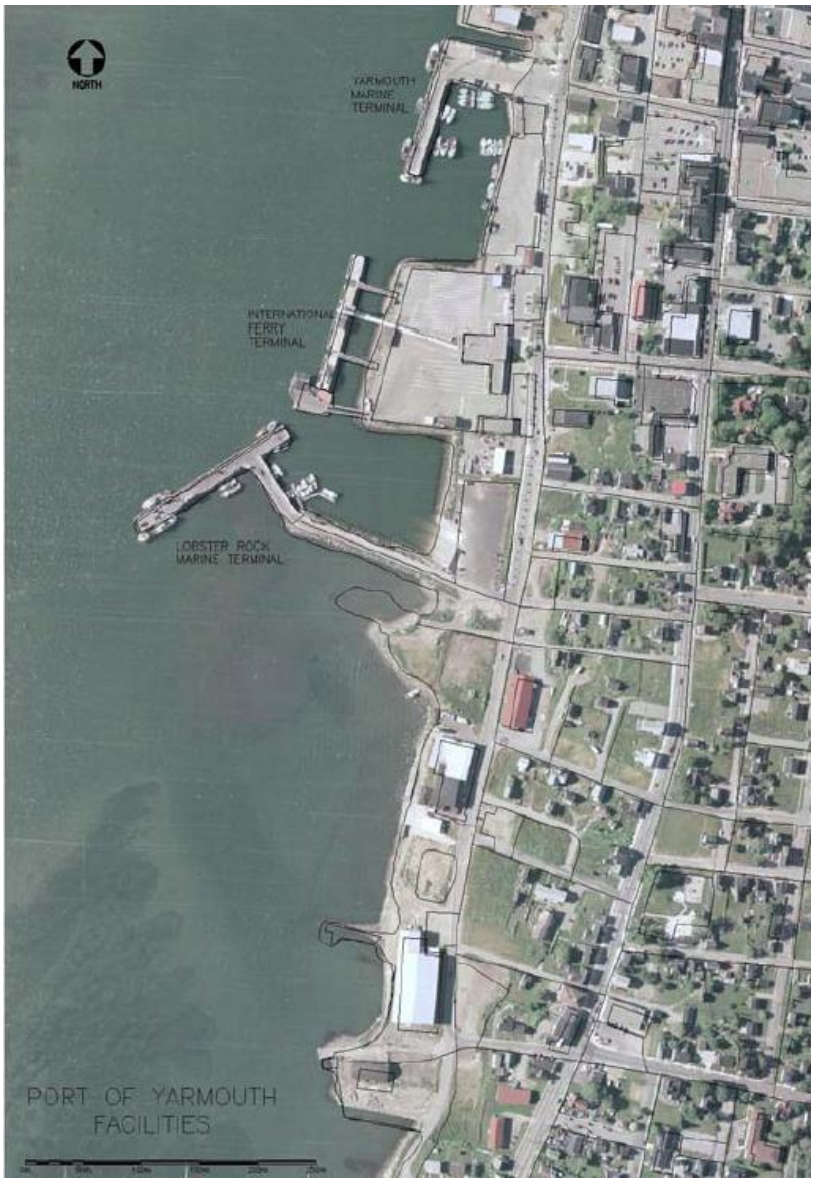
mega-yacht berth constructed for the Waterfront Development Corporation. The port occasionally handles shipments of herring, which are loaded by factory freezer vessels.

For FY 2007-2008, the port generated about $430,000 in revenue and spent $616,000.

4.4.2.2 Infrastructure

The length of the channel leading into Yarmouth Harbour is 1.3 NM. The main ship channel is approximately 2,500 m long, with a width of 180 m, narrowing to 100 m past Bug Light off the public wharves. There is a turning basin of 335 m x 250 m in the inner harbour. The size of vessel that can call on the port is limited to about 8-11,000 tonnes deadweight and 150 m length overall (loa).

Figure 4-43: Existing Port of Yarmouth



Source: Port of Yarmouth Master Plan

The port authority owns three facilities, which comprise 1,300 linear feet of berth space. These include:

- Yarmouth (Old) Government Wharf (built 1960)
- Yarmouth Marginal Wharf (built 1966)
- Yarmouth Lobster Rock Marine Terminal (built 1974)

These facilities are generally used for berthing fishing vessels.

Apart from the ferry terminal discussed in Section 4.2.2, the other important marine-related facility in the harbour is the mega-yacht berth.

There are a number of other waterfront properties in the harbour which see little marine-related activity. These include:

- Bunker Island Oil Tanker Terminal
- Killam's Wharf
- Waterview Marine Wharf
- Yarmouth Sea Products Wharf
- Scotia Garden Wharf

4.4.2.3 Current Traffic

The only cargo handled in recent years has been some herring loaded onto a factory freezer vessel.

4.4.2.4 Current Issues

One issue impacting Yarmouth is access to the waterfront. As the port's Master Plan points out "the routes are indirect in some locations and new truck routes have recently been proposed for the area". There are roadway constraints between the termini of both Highway 103 and Highway 101 and the port, which have been the subject of another recent study. These constraints are discussed in Section 4.3 above.

According to the port Master Plan, facilities in the port are structurally sound. However, a limitation is the water depth alongside berths and piers. Dredging last took place over a decade ago.

There has been some discussion about the condition of the International Ferry Terminal, with some suggestions by local stakeholders that a new terminal could become a landmark structure for Yarmouth Harbour and this part of Nova Scotia.[57]

4.4.2.5 Planned Projects

The Port of Yarmouth has developed a comprehensive Port Master Plan which includes a number of projects and concepts.

[57] Ekistics Planning & Design, "Yarmouth Downtown Blueprint", Draft report, December 2009.

The document includes an international border crossing strategy, a waterfront development initiative as well as infrastructure and management initiatives.

In terms of waterfront development, it suggests 1) a "signature" waterfront attraction that involves waterfront research, education and entertainment; 2) a training facility in conjunction with an appropriate educational institution; 3) setting aside several locations to construct finger-style fishing piers; and 4) incorporating housing into those areas of the waterfront which are too shallow for vessel activity.

Proposed infrastructure improvements include:

- Yarmouth Marine Terminal Reorientation and reuse
- Lobster Rock Marine Terminal-Re-orientation and reuse;
- Yarmouth Marine Global Logistics Park and Free Trade Zone;
- International ferry facility;
- Bulk Export Terminal; and
- Harbour dredging

The costs of these projects are:

Figure 4-44: Proposed Port of Yarmouth Projects

Project	Cost estimate ($M)
Dredging	6.5
Global Logistics park	12.0
Lobster Rock Upgrade	.5
Marine Terminal Upgrade	.7
Marginal Wharf Upgrades	.3
Breakwater Construction	.530
Total	$20.530

Source: Port of Yarmouth Master Plan

4.4.2.6 Suitability for Serving Current and Forecast Traffic Flows

As described above, Yarmouth has an aggressive and imaginative plan for moving forward. How much of this plan is "real" or feasible remains to be determined. Many of the projects will require further study before they are "shovel-ready". Likewise, some of the ideas for new shipping services and corridor development need full feasibility and market analysis before the construction of new facilities should be considered.

4.4.2.7 Forecast

Yarmouth's master plan envisions a redevelopment of the international ferry pier, a ro-ro service to New England to serve the fishery, and a redevelopment of Lobster Rock for the fishing fleet, as well as a marine logistics park. As no business case analysis has been provided other than the port master plan, it is difficult to assess the impact on cargo volumes through the port.

4.4.3 Shelburne

The Shelburne port and wharf were transferred from Transport Canada to the federal Department of Fisheries and Oceans (DFO) in 1996, as part of Transport Canada's port divestiture program.

In 2006, the Town of Shelburne took over the marine terminal from DFO, and now administers it through a locally-appointed port authority.

4.4.3.1 Role in Regional Transportation System

Until 2007, the Port of Shelburne played quite an important role in the SWNS regional transportation system. The port was served by Eimskip, an Icelandic general cargo and container service which called at Shelburne bi-monthly with vessels sailing from Argentia, NL to Everett, MA and Richmond, VA, and in the opposite direction. While predicated on the shipment of in- and out-bound seafood, the service also carried general cargo to and from SWNS.

Shelburne Harbour

Source: CPCS

Since Eimskip switched its container / break bulk service from Shelburne to Halifax, it has continued to truck product back and forth between Halifax and Shelburne. However, the Halifax port call also allows it to attract cargo from inland markets served by rail. The Eimskip operation in Shelburne did prove that small vessels with their own ship's gear can be handled in regional ports with little infrastructure.

In addition, Green Line, a Norwegian reefer vessel operator, has also called at the port sporadically, basically on inducement.

In 2008, a Kent Line vessel discharged 6,700 tonnes of sea salt at the dock. In October 2009, the port was scheduled to host the M.V. *Balmoral*, a 1,350-passenger cruise ship, but the ship was not able to call due to high winds.

An Irving-owned shipyard is also located in the harbour and has recently (December 2009) received provincial funding to upgrade.

Shelburne's current role in the regional transportation system is to serve the needs of its principal tenant, Continental Seafoods, a division of Clearwater Fine Foods, which services 12 vessels along the outer berth. The facility is also the base for six private fishing boats that berth in the eastern inner basin.

4.4.3.2 Current Traffic

Cargo traffic has varied considerably over the past number of years. In 2005, the last year that detailed Statistics Canada data are available, the port handled 10,060 tonnes of containerized exports and 25,274 tonnes of containerized imports; the port also handled 660 tonnes of non-containerized exports and 15,421 tonnes of imports.

In 2005, containerized exports included frozen fish, fresh fish, packaging, excavating machinery, autos, prefabricated buildings and scrap wood, mostly destined to Reykjavik, Iceland. Non-containerized exports included "salted, dried, smoked fish, or fish meal" destined for New Bedford, MA.

Containerized imports included live fish; fresh or chilled fish; frozen filets; salted, dried or smoked fish; aviation fuel, particle board; packing containers; moving, grading or excavation machinery; agricultural or horticultural machinery; aircraft parts, and general cargo, all of which was imported from Reykjavik. Non-containerized imports included frozen fish; salt; salted, dried or smoked fish; and general cargo.

In 2007, the port handled 2,237 tonnes of domestic and 4,744 tonnes of international cargo. In 2008, it handled 3,355 tonnes of domestic cargo and 9,456 tonnes of international shipments.

4.4.3.3 Infrastructure

The Shelburne wharf is located at the end of Water Street in the town of Shelburne, on a peninsula that extends into Shelburne Harbour, one of the largest harbours in Nova Scotia. The property associated with the wharf includes slightly more than 11 ha of land.

The wharf itself is characterized by its "T" shape, and also has a small marginal wharf on the east side, which is only accessible by a tenant, Continental Seafoods. The stem portion of the "T" projects 130 m from shore while the top of the "T" sits "off-centre" to the west and is approximately 163 m. This section runs about 65 m to the east (shallow side) and 98 m to the west in deeper waters. The top of the "T" is approximately 20 m wide. The depth of the wharf according to a 2008 survey was 9.5-10.5 m. The "T" shape of the wharf creates two inner basins, a deeper basin to the west and a shallower basin on the east used by independent fishers.

The wharf itself is a creosoted timber pile structure with a timber fendering system on the outer face and a concrete deck. The wood pile structure has an open face but the top of the "T" protects the inner sections from the southern fetch of the harbour.

4.4.3.4 Current Issues

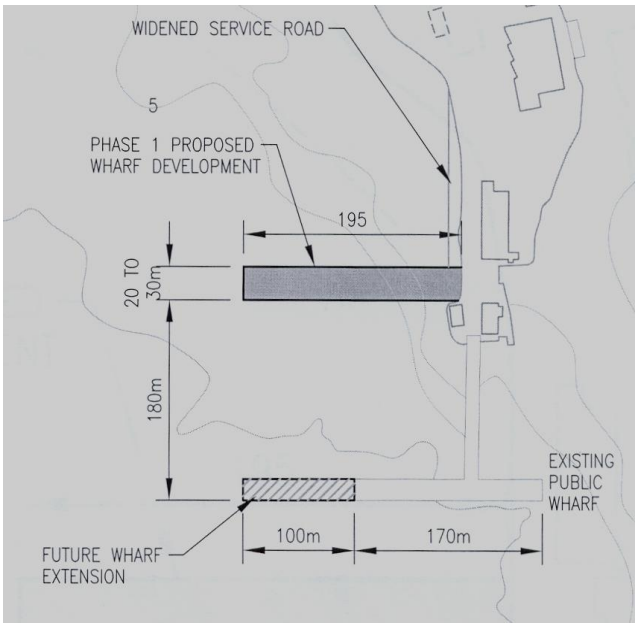
The Port of Shelburne's main objective in developing its wharf expansion is to increase the amount of berth space available for fishing vessels and to lessen crowding at the port when large vessels are working. The port had considered several configurations which would have provided more open space to store containers and bulk cargo, and some back up land to work such vessels, but preferred the option which provided the most linear berth space.

4.4.3.5 Planned Projects

As of February 2006, the Shelburne Harbour Authority proposed to build a new wharf, 195 m x 30 m, plus a 100 m westward extension to the existing "T" and to infill the northwest arm of the wharf's new "T". The southern portion of the infill would be used as a marshalling yard. Dredging would be required to achieve a depth of 7.5 m.

The southern portion of the infill will be used as a marshalling yard. Dredging will be required to achieve a depth of 7.5 m.

Figure 4-45: Shelburne Marine Terminal Concept



Source: Town of Shelburne

The project would include additional floating docks and a widening of the service road. The cost of the proposed project is $5 million.

4.4.3.6 Forecast

Shelburne's main cargo customer, Eimskip, left that port for Halifax in 2007. The company still moves cargo into and out of Shelburne, but attempts to contact the company to determine the potential to move the operation back there or re-implement a port call there were not successful; Eimskip has also been caught up in Iceland's financial woes and has been trying to sell its two large freezer storage companies, Atlas Cold Storage and Versa Cold Storage.

Shelburne has also studied the notion of a ferry service to Gloucester or Boston, but details of this project have never been made public.

Black Bull could potentially ship out Shelburne or Yarmouth, as they are a similar distance away, but potential volumes are impossible to determine at this time with any degree of precision.

The port anticipates that it would see increases of 5, 10, 20, 10 and 10 percent in traffic over the five years after its new facility is built (see 4.4.3.5 above).

4.4.3.7 Suitability for Serving Current and Forecast Traffic Flows

When Shelburne undertook the development of a Business Plan for its port facility, the port handled containers for Eimskip, some refrigerated cargo with Green Reefers, and was contemplating handling quartz for Black Bull Resources. Eimskip shifted to Halifax, Black Bull has had difficulty bringing its product to market, and Green Reefers are not very active in this market. The Port Authority decided to concentrate on its core business, the fishing industry, and to take advantage of having a major tenant, Clearwater Seafoods adjacent to its property. The proposed project at Shelburne will service these needs and be able to handle to occasional cargo and cruise ship as well.

4.5 Airports

4.5.1 Yarmouth International Airport

4.5.1.1 Characteristics

The Yarmouth International Airport was transferred from Transport Canada to the Yarmouth Airport Commission Association on October 1, 1997. The Commission is a non-profit organization governed by a board of volunteer directors. After taking ownership of the airport, the Commission concentrated on enhancing services and investing capital to secure the future of the airport. Upon fulfilling its 10-year commitment to Transport Canada, the Commission transferred the assets to the Yarmouth International Airport Corporation, a municipal corporation.

4.5.1.2 Role in Regional Transportation System

Until the termination of service by Starlink Airlines in December 2009, Yarmouth Airport provided a link for local business people who needed to travel quickly to either Halifax or Portland. It provided connections to all the airlines serving Halifax, as well as Portland. For Halifax and Portland residents, Starlink provided a link between those two markets, which would not otherwise be possible without the Yarmouth stop. Service by Air Canada was withdrawn some years ago.

4.5.1.3 Current Traffic

4.5.1.3.1 Air Passengers

From February until December 2009, Starlink Aviation provided twice daily service linking Yarmouth with both Halifax and Portland, using a Jetstream 31 aircraft. The service was provided with a $2-million contribution from the Government of Nova Scotia, which was announced the same day as the funding for Bay Ferries. The rationale was that

Starlink Jetstream 31

Source: Starlink Aviation

both initiatives would help stimulate the local economy. From March to June the service carried 1,806 passengers.

Total tax inclusive fares from Halifax to Yarmouth ranged from $145 to around $200 each way; flying time was 45 minutes. Total tax inclusive fares from Yarmouth to Portland were between $170 and $270 each way; the flying time was around 1:08 westbound and 58 minutes eastbound. Flights from Portland to Halifax and Halifax to Portland, which stopped in Yarmouth, had a total tax inclusive price of between $200 and $310.[58]

4.5.1.3.2 Air Cargo

There is currently no air cargo service out of Yarmouth. As discussed above, some seafood produced in South West Nova Scotia is exported by air, but the absence of any demand for cargo to be flown into the region leads to an imbalance in traffic which adversely affects the economics of an air cargo operation within the region. Seafood is trucked to Halifax or airports as far away as Boston, New York, Montreal and Toronto, in order to be flown to world markets.

An air cargo study conducted for the Yarmouth Airport Commission in 2000 estimated that the total potential volume produced in the vicinity of the airport was 4-6 million tonnes, or 80,000-110,000 kg per week. At the time, this was estimated to represent about 20 percent of what was shipped from Halifax.[59]

A critical aspect of any discussion regarding air cargo, particularly between SWNS and the "Boston" market, is the cost of air freight versus trucking. It costs an estimated $0.20 per kg to truck to JFK Airport in New York, while the cost to fly from Yarmouth to JFK would range between $0.80-$1.00 per kg. Whether the commodity could fetch more per kg as a result of faster transportation needs to be determined.

Yarmouth Airport Terminal

Source: CPCS

In 2008, Halifax handled 27,500 tonnes of air cargo, down from a peak of 32,000 tonnes in 2004. One issue for Halifax has been a reduction in large 767-type passenger aircraft serving the airport in favour of smaller planes going directly to more destinations, including the US. This change has resulted in less aircraft "belly" capacity being available for cargo.

A private developer is presently (December 2009) constructing a new multi-tenant air cargo facility at Halifax Stanfield International Airport (HSIA). The developers, Gateway Facility PLC are closely linked to a freight forwarding firm, Worldwide Perishables and ABX Aviation, which

[58] These prices and flight times are drawn from Starlink's website for a sample of different dates in late 2009 and early 2010.
[59] "The Feasibility of Operating a Multi-Modal, Multi-Purpose Air Cargo Terminal at Yarmouth International Airport", Yarmouth Airport Commission, June 28, 2000.

provides one of several air cargo services operating out of HSIA. Others now include Cargojet, Purolator, and Fedex.

4.5.1.4 Infrastructure

Yarmouth Airport facilities include a modern terminal building and combined services building which houses a 2001-built $500,000 maintenance garage and vehicles used for clearing runways. The airport has two runways, two taxiways, separate parking aprons for both commercial and general aviation. There is a Category I instrument landing system (ILS), a VHF omni-directional range/distance measuring equipment (VOR/DME) and a non-directional beacon. The airport property has 3.16 km² (1.2 mi²) of easily accessible, industrial real estate.

4.5.1.5 Current Issues

The biggest issue with respect to Yarmouth Airport would appear to be retaining and sustaining air service. One of the weaknesses of the Starlink service was that it did not have any connecting carrier agreements, either in Halifax or Portland.

4.5.1.6 Suitability for Serving Forecast Volumes

The existing facility at Yarmouth International Airport is adequate for existing and any future passenger air travel needs. The market needs consistent, reliable service on a long term basis from one or more carriers in order for passengers to be attracted to use it.

The issue of air cargo facilities was last dealt with in 2002. A proposal developed by a local consultant was received by ACOA and the Government of Nova Scotia, and reviewed by a third party.[60] While there appeared to be a large market for outbound shipments, the inbound market was very small. Moreover, the facility would have required ongoing subsidy, as the forecast rents were not realistic for the Yarmouth market. There was also the "chicken-and-egg" question of which comes first: air cargo service or air cargo facilities. Many shippers indicated they were close enough to the airport to drive to the plane with product on a just-in-time basis.

4.5.1.7 Forecast

Passenger air service at Yarmouth was withdrawn as of 1 December 2009.

4.5.1.7.1 Air Passengers

Starlink Aviation provided all scheduled passenger air service into and out of SWNS until 1 December 2009. Air passenger volumes were stronger between Yarmouth and Portland than they have between Yarmouth and Halifax. About 50 percent of Halifax passengers were connecting to another flight and the rest were staying in the city for business or visiting friends and relatives. In the case of Portland, most travel was just to Portland, which had been somewhat of a surprise, as there was an expectation of more connecting business.

There was little sales effort in Halifax, and the service did not have connecting carrier agreements with any other airlines. New management of the airport had intended to work with Starlink to improve these efforts.

[60] MariNova Consulting Ltd., "Yarmouth Air Cargo Terminal Facility Review", ACOA and NS Economic Development, May 2002.

Airport management would also like to attract seasonal charter flights if enough interest is shown by consumers in the SWNS marketplace, who tend to drive to Halifax to catch such flights.

This Starlink service would have continued only so long as the Government of Nova Scotia continued its financial support, but the effort burned through $2 million in less than 12 months. According to press reports these funds were supposed to last up to 5 years.

4.5.1.7.2 Air Cargo

The airport's new management sees lots of potential to develop the air cargo market around seafood exports. Key issues are attracting carriers as well as finding shippers willing to pay a premium over trucking via ferry, to get to airports in Boston and New York City.

The major issue in attracting air cargo capacity to Yarmouth is the lack of a market for inbound goods. In the absence of such a market, the prospects for the growth of air cargo at Yarmouth must be viewed as limited unless an outbound carrier can be found to serve the airport.

4.5.2 Digby Municipal Airport

4.5.2.1 Characteristics

The Digby Municipal Airport (DMA) is located about seven kilometres southwest of the Town of Digby. Access from Highway 101 is via Route 303, Acacia Valley Road, Ridge Road and Bloomfield Road.

The Municipality of the District of Digby purchased the Digby Municipal Airport lands and began construction of the initial airport infrastructure in 1974. The airport was completed in 1976 with a 3,000' x 75' runway and in 1977 was equipped for night operations with the addition of pilot-controlled lighting. In 1979 the municipality built the first phase of the administration building, and added a Non-Directional Beacon and communications equipment. In 1989, the runway was lengthened to 3,950'. Additional airport upgrades have included airfield and administration building improvements, an aviation weather reporting station, and perimeter fencing.

4.5.2.2 Role in Regional Transportation System and Economy

The DMA has been identified as an important economic driver for the municipality. It is used mainly for general aviation and emergency dispatch in the area.

According to the business plan for DMA, the airport is focused on general aviation opportunities, i.e. all commercial non-scheduled private aviation activities, including personal business air charter, corporate aviation, recreational flying, surveying, spraying, sightseeing, flight training, government and military aviation, and medical evacuation.[61]

As such the DMA plays only a minor transportation role in the economy of SWNS.

[61] Jozsa Management and Economics, "Strategic Business Plan, Digby Municipal Airport", Jozsa Management and Economics, 2006.

4.5.2.3 Current Traffic

According to Statistics Canada data, between 2005 and 2008 there have been between 1,300 and 1,470 aircraft movements at DMA. This is down from 1,680 movements in 2004. In 2008 there were 1,466 movements.

4.5.2.4 Forecast

In the DMA business plan, the baseline projection is for about 1,680 movements in 2016, the same level achieved in 2004. With an aggressive development and marketing plan movements could reach about 2,304 in 2016. The low projection sees a decline from about 1,400 to 1,039 in 2016.

The DMA business plan concluded that DMA

- is unlikely to attract scheduled airline service;
- suffers from a lack of community visibility;
- may not necessarily be financially self-sufficient, especially in the short term;
- levels of service to general aviation should be improved, or at least remain the same;
    - management and marketing strategy should;
    - reinforce position as an economical and high value regional general aviation airport;
    - retain existing traffic base;
    - maximise the utilisation of the airport and airport lands; and
    - run the DMA as an economic development asset.

The business plan also concluded that the airport would continue to run an operating deficit, but that such a situation was common for airports of this type.

5 Ferry Configuration Options and Analysis

5.1 Evaluation Criteria

The following criteria were developed as a result of extensive consultation and research conducted for this study, including previous reports prepared by the consulting team.[62] The transportation system of SWNS needs to:

- Respond to the time sensitive needs of the large primary fishery and fish product producers;
- Respond to the needs of the tourism industry throughout SWNS with concentration around the Yarmouth and Digby areas;
- Be safe and reliable;
- Have a convenient schedule and suitable frequency;
- Be comfortable and have modern amenities; and
- Be reasonably priced and affordable.

The study considered non-user impacts such as broad economic development impacts and environmental effects.

Lastly, but certainly not of least importance, the commercial viability of operating ferry service options must be examined. The business case for each option must include an assessment of operating and capital costs compared to estimated operating revenues.

It is worthy of note that many of the above parameters interact with one another and are therefore not mutually exclusive. It also should be noted that some of them are essentially qualitative in nature so precise measurement is difficult.

The purpose of this chapter is to discuss each of the evaluation parameters in the context of SWNS needs and the constraints mentioned above. A number of specific ferry service options are then evaluated using the criteria discussed below.

5.1.1 Fishing Industry Time Sensitivity

As previously documented, the fishing industry in Nova Scotia is one of the most prominent contributors to economic and export activity in the province. This activity is concentrated in

[62] Canadian Facts, "Report on Ferry Rate Sensitivity", Transport Canada.; DPA Group Inc., "Bluenose Ferry Schedule Reversal Impact Study", 1990; Corporate Research Associates, "Marine Atlantic Fundy Service Travel Market Demand Study, 1992; Geoplan Consultants Inc., "Marine Atlantic Bay of Fundy Ferry Services Demand Characteristics and Service Options, 1994; Belleclaire, MariNova and Geoplan Opus, "Digby-Saint John Ferry Service – Impacts and Options" 2006; Opus International, MariNova and Polar Design Sales, "Digby–Saint John Ferry Service, Phase I, Traffic and Socio-Economic Analysis and Phase II Service Option Alternatives", 2007.

SWNS with over 50 percent of value and volume of landings. The industry has been relatively stable during the current and previous recessions and is anticipated to have a bright future.

SWNS sells a substantial portion of its fresh in the Boston market. Freshness and the timing of arrival in this marketplace are absolutely critical to the value of the delivered product. The journey from SWNS to Boston can be accomplished by highway or by a combination of highway and ferry using the Digby-Saint John ferry service. The issue of product mortality for lobsters shipments overland versus by road and ferry was also mentioned in stakeholder briefings.

The impact that each transportation option has on this sector is therefore extremely important to the economy of SWNS and to that of Nova Scotia as a whole. As a consequence, each of the options in Chapter 5 will be evaluated from this perspective.

5.1.2 Tourism Impacts

The economic impact of tourism in the SWNS region, as previously documented, exceeds $100 million per annum. Digby County ($33.4 million) and Yarmouth County ($31.0 million) are the largest recipients of this activity but Annapolis County ($27.1 million) is not far behind and Shelburne County's ($13.8 million) activity is certainly important.

As ferry service terminal locations, both Digby and Yarmouth are entry/exit points for visitors to SWNS. It is therefore not surprising to see the clustering of tourism infrastructure and expenditures in these counties. Each ferry service option will be evaluated for the impact on tourism on the SWNS region in aggregate, and Yarmouth and Digby counties are evaluated individually.

5.1.3 Safety and Reliability

Transport Canada Marine Safety is responsible for monitoring safe operations of vessels and environmental protection for domestically flagged vessels and foreign flagged vessels operating in Canadian waters. Actual inspection activities may be delegated to recognized organizations such as Lloyds Register of Shipping and Det Norske Veritas.

In addition, Bay Ferries have a formal management system designed to provide safe, efficient, and effective operating procedures. A safe operating environment should therefore be consistent among various vessel or service configurations.

Fall, winter and spring weather and sea states in the Bay of Fundy occasionally result in the cancellation of sailings to ensure the safety of the travelling public, operating staff and physical assets. Since the Yarmouth-Maine service was concentrated in the June to September period, it was very seldom affected by ambient conditions. The Digby-Saint John service, with year-round operations however, has had an average of 11 cancellations per year for the past five years. It should be noted that on average only one of these occurred during the summer months. Land-based options will also experience effects from severe weather but are seldom shut down completely as a consequence.

Aging assets have more potential for service interruptions resulting from mechanical failure or preventative maintenance. As a 39-year-old vessel, the *Princess of Acadia* has a biennial month-

long refit. Newer vessels will be expected to have less chance of unexpected mechanical failure and shorter refit periods and therefore have a higher reliability factor.

5.1.4 Schedule and Frequency

Both commercial and passenger traffic are facilitated by the frequency of non-road transportation options (road options are by nature available on a continuous basis, notwithstanding extraordinary circumstances). For instance, providing more departure and arrival times for a ferry service increases the likelihood that the service will be available when a user needs it, thus increasing traffic volumes on the service. However, this must also generate sufficient revenue to offset additional costs.

In a 2002 paper that examined ferry and roro freight transportation to Ireland, Great Britain and Tasmania, the key factors for choosing the type of service selected were identified (Figure 5-1). As can be seen below, service frequency ranks number 1 in two of the situations and is 3rd in the other.

Figure 5-1: Important Factors in Port/Shipping Company Choice in Order of Precedence

Irish Sea	English Channel	Tasmania
Punctuality	Service Frequency	Frequency
Space Availability	Convenient Schedules	Price
Service Frequency	Delays, Cancellations	Transit Time
Response to Problems	Fastest Route to Destination	On-time Performance
Value for Money for Rate	Space Availability	Damage
Ferry Arrival Time	Convenient Schedules	Commitment
Ferry Departure Time	Fast Check-In	Problems

Source: Mangan, Lalwani and Gardner, "Modelling Port/Ferry Choice in RoRo Freight Transportation", 2002.

Frequency of service has also been identified as an important service characteristic by a number of stakeholders within SWNS and will be utilized as an evaluation criterion for ferry service options.

5.1.5 Passenger Comfort and Amenities

Newer vessels will have more modern physical amenities. It should be remembered, though, that passenger satisfaction is a combination of both physical amenities and the quality of service delivery provided by individuals.

Sea journeys come with motions and vibrations that most individuals do not experience on a daily basis. Sea sickness has always been a factor on conventional displacement vessels and the Bay of Fundy ferry services are no exception. With higher sea states, motions are amplified. The length of exposure will also affect passenger comfort.

The high speed catamaran service provided by Bay Ferries produced different motions and vibrations than a conventional displacement vessel. Stakeholders consulted for this study believe that motion sickness is more of a factor on the high speed service than on previous

conventional ships utilized on Yarmouth-Maine crossings. Furthermore, at 5.5 hours the Yarmouth-Portland crossing was one of the longest high speed vessel crossings in the world, which exacerbated motion sickness impacts.

From an evaluation perspective, the consulting team have credited conventional ships with higher comfort levels. For high speed vessel options, shorter crossings have higher comfort ratings than longer ones.

5.1.6 Pricing & Affordability

The price charged for any good or service must create a value proposition compared to alternatives before an individual or firm follows through with the act of purchase. The economic term "price elasticity of demand" refers to the sensitivity of the demand for the service/good in question to changes in its price. Items for which demand changes by a greater percentage than the percentage change in price are said to have a high price elasticity of demand.

As early as the 1980s, Bay of Fundy ferry service rates were determined to be at elastic levels.[63] Research conducted on users and non-users of ferry services in 1992[64] (six years before the *Cat* was introduced), indicated that the primary reasons for taking a ferry across the Bay of Fundy were to save or reduce driving time or to save overall travel time. However, the number one reason for *not* taking a ferry was its perceived high cost. This sentiment was most prevalent amongst U.S. visitors.

Consumer sentiment, as measured by stakeholder input and customer satisfaction surveys conducted on behalf of Bay Ferries, indicate this price sensitivity still exists. During the last ten years, as improvements in regional highway networks have occurred, the value proposition for taking ferry services has continued to be under pressure.

As a consequence, 2009 rates for Bay of Fundy ferry services are considered to be at or beyond sustainable levels, and are probably discouraging many travellers and potential customers who may otherwise be interested in using the ferry. Some cruise ferry configurations, with substantial amenities, could allow for slight elevations of rates but the level of potential increase is felt to be limited.

For comparison of ferry service alternatives, rates are not differentiated and hence are not a performance criterion.

5.1.7 Non-User Impacts

5.1.7.1 Network and Economic Productivity Benefits

Stakeholders have made the statement that Bay of Fundy ferry services drive demand within the study area and have provided examples of firms whose location was dependent on the availability of ferry service. In a benefit-cost framework, the analyst must determine whether activity will be eliminated or redistributed as a consequence of transportation infrastructure change.

[63] Canadian Facts, *Op.cit*.
[64] Corporate Research Associates, *Op.cit*.

There is also a widely held belief that transportation infrastructure provides economic stimulus in the form of productivity enhancements for all businesses within a catchment area. Productivity improvements will stem from reduced transportation costs for both inputs and outputs. In terms of our evaluation exercise, it is likely that ferry service options providing more capacity and utilization will increase economic development opportunities within SWNS.

5.1.7.2 Environmental Considerations

A recent comparison of green house gas (GHG) emissions for travel between Digby and Saint John by highway and ferry[65] showed that emissions are currently slightly higher for the ferry. One of the contributing factors is the poor fuel efficiency of the 39-year old *Princess of Acadia* engines. In addition, fuel consumption, and by extension GHG emissions, are high for high speed vessel options, compared to conventional vessel alternatives.

Since the Princess of Acadia has reached the end of its useful life, the following benefit-cost assumes its replacement by a more modern vessel. Therefore, environmental impacts for conventional ship options are not considered. However, environmental benefits will be evident for conventional ships when compared to high speed vessels and this factor will be noted in service alternative evaluations.

5.1.8 Commercial Viability

Commercial viability is defined by operating revenues being large enough to cover all costs, and providing a sufficient level of return for service providers.

We evaluate existing and contemplated ferry options using our database of ship operating costs and expertise developed from a multitude of previous assignments. Revenues are estimated utilizing traffic forecasts, the 2009 tariff, and ancillary service sales ratios, though this study does not include a detailed assessment of operating efficiency which could potentially identify opportunities for additional cost savings or revenue generation. A number of assumptions have been made to estimate revenue for those options outside of the 2009 status quo.

During the past number of years, because of declining traffic levels and increased operating costs, both of the existing Bay of Fundy services have received substantial levels of government support.

5.1.9 Summary

Based on the discussion above, ferry service options are evaluated using the following criteria:

- Fishing Industry Time Sensitivity;
- Tourism Impacts;
- Safety and Reliability;
- Schedule and Frequency;

[65] Opus International Consultants, "Saint John to Digby Economic Impact Assessment Update", Transport Canada, 2009.

- Passenger Comfort and Amenities;
- Network and Economic Productivity Benefits;
- Environmental Considerations; and
- Commercial Viability

Where possible, each parameter is evaluated relative to other transportation alternatives. This assists in a more detailed benefit cost assessment of short listed options which occurs in the next section. Some of the criteria are specific to ferry services and need to be evaluated relative to other ferry service options.

5.2 Options Screening Analysis

The purpose of this section is to evaluate the long list of potential ferry service options that could be implemented in the Bay of Fundy. Options are qualitatively evaluated using the criteria discussed above. Based on this evaluation, a short list of ferry service options are the subject of more detailed analysis below.

5.2.1 Framework for Structuring Options

Ferry service options were structured around the terms of reference requirement to examine the following ferry service configurations:

- Option 1: Ferry services at Digby and Yarmouth;
- Option 2: Ferry service at Yarmouth only;
- Option 3: Ferry service at Digby only;
- Option 4: Split ferry service at Digby and Yarmouth; and
- Option 5: Short sea shipping service to the US from Yarmouth.

We were subsequently tasked with examining the implications of no service to either Digby or Yarmouth, which is essentially the impact of the status quo as of the project commencement in August 2009 (discussed as Option 1(a)), prior to the announced cessation of Bay Ferries' high speed service in 2010.

Each of the service configurations mentioned above can be delivered with a range of vessel types. Different vessel types may provide for individual user needs in fundamentally different ways. For instance, a high speed vessel may provide an excellent solution for customers wishing to save travel time but will not, because of deadweight restrictions, provide for significant volumes of commercial vehicles. Brief descriptions of the various vessel types referenced in the remainder of this chapter are described in the following section.

5.2.2 Vessel Types

Ropax: A ferry vessel designed to accommodate passengers and highway vehicles including commercial units as illustrated in Figures 5-2, 5-3 and 5-4.

Figure 5-2: M.F. Northern Adventure, 2004-built, 600 passengers, 101 auto ropax

Source: BC Ferries

Figure 5-3: M.F. Bergensfjord, 1993-built, 900 passenger, 300 auto ropax

Source: www.ferry-site.dk

Figure 5-4: M.F. Lisco Maxima, 2009-built, 600 passengers, 500+ autos

Source: www.ferry-site.dk

High Speed Passenger: A passenger and passenger vehicle vessel capable of operating speeds of in excess of 30 knots in normal sea states. While a number of technical variations exist, most high speed vessels have a catamaran hull structure.

Cruise Ferry: A vessel combining the features of a ropax ferry and a cruise ship. On-board amenities would be considerably enhanced over a typical ferry service with the addition of cabins, entertainment/recreational opportunities and fine dining. (Refer to Figures 5-5 and 5-6 for examples).

Figure 5-5: M.F. Queen of Scandinavia, 1981-built, 1,675 passenger, 350 car cruise ferry

Source: www.ferry-site.dk

Figure 5-6: M.F. Princess of Norway, 1986-built, 1,290 passengers, 500 autos cruise ferry

Source: www.ferry-site.dk

Commercial Roro Service: In the context of this report, this vessel is restricted to the handling of "dropped" highway trailers and other unaccompanied wheeled vehicles. Most such vessels can only carry 12 passengers. Figure 5-7 depicts an example of a roro vessel.

Figure 5-7: M.F. Petersburg, 1986-built, 80 trailer roro vessel

Source: www.ferry-site.dk

Figure 5-8 presents a comprehensive listing of ferry service configuration options that consider varying vessel types. It should be noted that the consulting team has exercised some discretion in the application of some vessel types to particular service configurations. For instance, because of stage length and user requirements, a cruise ferry is not deemed to be practical on the Digby-Saint John service. Each of the configuration options contained in Figure 5-8 are described in more detail beginning in Section 5.3.

Figure 5-8: Preliminary Ferry Service Configuration Options

Option	Digby-Saint John	Yarmouth-Maine	Yarmouth-Gloucester
1 (a)	Ropax provided by the *Princess of Acadia* until 2011 with replacement by a 1 year charter followed by a $50-million used ropax.	Seasonal high speed service to Bar Harbor and Portland.	No service.
1 (b)		Seasonal high speed service to Bar Harbor.	
1 (c)		Seasonal ropax to Bar Harbor, using a $50-million used vessel.	
1 (d)		Seasonal used cruise ferry to Portland, using a $50-million used vessel capable of handling limited commercial traffic.	
1 (e)	Ropax provided by the *Princess of Acadia* until 2011 with replacement by a 2 year charter followed by a new $100-million vessel.	Seasonal high speed service to Bar Harbor and Portland.	
1 (f)		Seasonal high speed service to Bar Harbor.	
1 (g)		Seasonal ropax to Bar Harbor, using a $50-million used vessel.	
1 (h)		Seasonal used cruise ferry to Portland, using a $50-million used vessel capable of handling limited commercial traffic.	
2 (a)	No service.	Year-round ropax service to Bar Harbor, using a $50-million used vessel.	No service.
2 (b)		Seasonal high speed service to Bar Harbor only.	No service
2 (c)		Seasonal ropax to Bar Harbor, using a $50-million used vessel.	Year-round service using a $10 million used roro vessel.
2 (d)		Seasonal used cruise ferry to Portland, using a $50-milliion used vessel capable of handling limited commercial traffic.	Year-round service using a $10 million used roro vessel.
3 (a)	Ropax provided by the *Princess of Acadia* until 2011 with replacement by a 2 year charter followed by a new $100-million vessel.	No service.	No service.
3 (b)	Ropax provided by the *Princess of Acadia* until 2011 with replacement by a 1 year charter followed by a $50-million used ropax.		
4	Winter ropax service (same vessel used for Yarmouth in the summer)	Summer ropax service from Yarmouth to Bar Harbor (same vessel used for Digby in the winter).	No service.
5	No service.	No service.	Year-round service using a $10 million used roro vessel.

5.3 Initial Screening of "long list" of Options

5.3.1 Option 1: Ferry Services at Digby and Yarmouth

The Option 1 analysis presumed ferry services would be offered at both Yarmouth and Digby, as was the case in 2009. However, the Government of Nova Scotia announced in late December 2009 that financial support of the Yarmouth service would be terminated in 2010. In the meantime, the operator, Bay Ferries Ltd., has stated it cannot continue operating the Yarmouth service without supplementary contributions. (It is worthy of note that both services were receiving government contributions to sustain operations).

There are a variety of vessel configurations that may be considered. Given previous experience, the consulting team believes the best type of vessel for the Digby-Saint John crossing is a ropax. Within the past 15 years, Yarmouth has had service to Maine using a ropax (*Bluenose*), a high speed vessel (*the Cat*) and a cruise ferry (*Scotia Prince*). All three of these vessel types will be considered for this port.

The *Princess of Acadia* (POA) is the current vessel on the Digby-Saint John crossing. It was purpose-built for this service in 1971. At 39 years of age, it is near the end of its economic life and will need to be replaced shortly. Replacement with a comparable new-build will cost in the order of $100 million and would not likely be available until the 2014 operating season. It has been assumed that a comparable used vessel, with upwards of 15 to 20 years of useful life can be purchased for $50 million, and available for the 2012 operating year. The actual price will vary according to market conditions and negotiations.[66]

Based on this discussion, four distinct options are considered:

- 1(a)-Digby-Saint John ropax with seasonal high speed service to Yarmouth and Bar Harbor;
- 1(b)-Digby-Saint John ropax with seasonal high speed service to Bar Harbor only - the operating scenario prior to 2006;
- 1(c)-Digby-Saint John ropax with a seasonal ropax to Bar Harbor only; and
- 1(d)-Digby-Saint John ropax with a seasonal cruise ferry to Portland only.

Options 1(a) to 1(d) anticipate a POA replacement with a used ropax. Options 1(e) through 1(h) anticipate a POA replacement with a new ropax. Because the latter four options vary only with the age of the POA replacement, they are not subjected to detailed criteria discussion below.

[66] Neither price assumes the payment of a federal import duty of 25% on the purchase price. The Department of Finance has recently proposed that this duty be waived for vessels in excess of 129 metres in length. (*Princess of Acadia* is 146.3 metres in length).

5.3.2 Option 1(a): Used Ropax (Dig-SJ) + Seasonal High Speed (Yar-BH & Port)

5.3.2.1 Fishing Industry Time Sensitivity

The high speed passenger service operated by Bay Ferries was not able to accomodate a substantial volume of commercial trucking units. In general terms, a seasonal Yarmouth-Maine service does not provide a good level of service to the fishing industry because peak requirements are in the months of December and January.

Virtually all commercial fish traffic moves on the Digby-Saint John year-round service. Moreover, the operator has adjusted the afternoon sailing schedule from Digby to assist early the morning arrival of commercial fishing traffic in the Boston marketplace.

There are substantive distance and time savings for commercial fish traffic taking the Digby-Saint John service compared to using the highway alternative. Approximately 570 kilometres of highway travel and two hours of travel time are eliminated by taking the ferry, depending upon where the shipment originates.

This option therefore provides a very good response to the needs of the SWNS fishing industry.

5.3.2.2 Tourism Impacts

Both ferry services are entry points for non-resident visitors into Nova Scotia as a whole and SWNS in particular. In 2008, Nova Scotia tourism statistics indicate overnight person visits of 29,500 for the Yarmouth entry point and 25,700 for the Digby entry point.

In strict numerical terms, the Digby and Yarmouth services were therefore roughly equal contributors to tourism activity. The Yarmouth entry number declined by 60.3 percent from 2004 to 2008 and the Digby volume has declined by 25.5 percent over the same period. The cancellation of the *Scotia Prince* service between Yarmouth and Portland in 2005, schedule changes to Bay Ferries' high speed service, and the overall decline of visitation from the United States have all contributed to the reduction in visitation.

Stakeholders in both Yarmouth and Digby believe their entry point (gateway) status contributes greatly to the tourism infrastructure in their respective communities and to the SWNS region at large. Hotels and motels as well as restaurants and other attractions were built in these communities over the years to cater to this business.

5.3.2.3 Reliability

Marine services in the Bay of Fundy are subject to cancellation from high wind conditions, unforeseen mechanical issues and refit requirements. High winds are more prevalent in the fall, winter and spring periods. The *Princess of Acadia* has a biennial refit/drydocking typically lasting 3-4 weeks and the service is not provided during this period.

Despite less than ideal operating conditions caused by winter storms on all roadway networks, and the occasional closing of the Cobequid Pass section of NS Highway 104, also due to winter conditions, highway access is seldom unavailable.

Given the above factors, marine options will generally be slightly less reliable than highway alternatives.

5.3.2.4 Frequency

Currently, the *Princess of Acadia* makes two round trips daily from late June to early September, and 11 trips per week in the shoulder seasons (early May until late June and early September to mid October). During the remainder of the year one round trip per day is made. Should sufficient demand warrant, particularly in the summer season, the potential exists to offer three daily round trips.

Since 2006, Bay Ferries' high speed vessel has made three round trips per week from Yarmouth to Bar Harbor, and four round trips per week from the beginning of July to early September were made to Portland. During the remainder of the June to October operating period, two round trips per week were made to Portland. The high speed vessel can also make two return trips per day to Bar Harbor (which it did before the introduction of Portland into the schedule) should traffic conditions warrant. Due to the crossing length, only a single round trip to Portland can be made.

The Digby-Saint John service also has a frequency level which can be increased in the event of higher demand, and has made three round trips per day in the past.

5.3.2.5 Passenger Comfort

As discussed in Section 5.1.7, a conventional ropax in most operating conditions is believed to produce less motion sickness than a high speed passenger vessel. Thus stated, the *Princess of Acadia* is generally more comfortable than the high speed vessel operated by Bay Ferries. The 5½-6 hour crossing between Yarmouth and Portland (2½ hours to Bar Harbor) is one of the longest high speed ferry routes in the world and this level of passenger exposure exacerbates motion sickness.

5.3.2.6 Network and Economic Productivity Benefits

As noted above in section 5.1.7, overall productivity benefits may emanate from investments in transportation infrastructure. For instance, input materials for a manufacturing plant will be cheaper to access as a result of reduced transportation costs. In one study of Canada's National Highway System, it was estimated that productivity benefits to commercial vehicles at 36 percent of commercial traffic user benefits.[67]

Benefits to commercial vehicle traffic on the *Princess of Acadia* have recently been estimated at approximately $5.7 million per year.[68] As a consequence, network and productivity benefits may amount to an additional $2.1 million. It should be noted that there is not universal acceptance of an incremental productivity enhancement impact at a theoretical level, and it is not normal practice to credit such an impact in benefit-cost analysis.

[67] HLB Inc., "Highway User Benefits Analysis of the National Highway System," 1998.
[68] Opus International, Transport Canada, 2009.

5.3.2.7 Environmental Considerations

Greenhouse gas (GHG) emissions of ferries are currently higher, compared to the GHG emissions of driving vehicles on alternative highway connections. This stems from the fuel consumption rate of a high speed vessel and the relative inefficiency of the 39 year old *Princess of Acadia* engines compared with newer propulsion units.

Newer engines on more modern ropax vessels would be expected to provide reduced GHG emissions for the Digby-Saint John ferry service compared to the highway alternative.

High speed catamarans use high amounts of fuel to achieve their operating speeds. Unless there are very large savings in highway travel from their usage it is expected that the high speed vessel will generate increased GHG emissions.

5.3.2.8 Commercial Viability

Digby-Saint John

The deficit level for the 2009 Digby-Saint John ferry service was estimated at $8.5 million for the calendar year 2009. Approximately $4.35 million of this amount was for extraordinary capital items related to the *Princess of Acadia* and the Saint John loading dock and wharf. The $4.35 million was expensed in 2009. To obtain a better illustration of the operating deficit, we have annualized the extraordinary capital over a two year period. This has the effect of reducing the deficit by $2.2 million to a level of approximately $6.3 million.

In 2008, the Governments of Canada, Nova Scotia and New Brunswick announced an extension of financial assistance to the Saint John – Digby ferry service to January 2011. For the purposes of this benefit-cost analysis, it is assumed that a suitable used ropax will be chartered in mid-2010 for a fee of $1 million per month. An additional $10 million has been assumed for modifications in 2010, prior to the vessel's commencement on the route in January 2011. The short term charter vessel could be purchased for about $50 million in 2012.

On the revenue side, the introduction of the chartered vessel is expected to stimulate passenger and PRV revenue by 5 percent in 2011.

The net impact of the expense and revenue changes discussed above is a 2010 deficit of $19.9 million, declining to $16.1 million in 2011 and $10.9 million in 2012. A longer term deficit of approximately $11.7 million is projected.

Yarmouth-Maine

The Government of Nova Scotia provided contributions of $18.9 million over a two year period commencing in the fall of 2007. These contributions were necessary to fund operating deficits of the seasonal high speed ferry service between Yarmouth and both Bar Harbor and Portland, Maine. The vessel used for the service, the *Cat*, is owned and financed by Bay Ferries Ltd., so capital and interest charges on this vessel were included in their cost base.

The Province has announced contributions for this service will not be provided in 2010 and the operator says the service will not be offered without those contributions.

Notwithstanding the current situation, based on traffic/revenue and operating expense calculations, the consulting team has estimated deficits of $8.8 million, $6.9 million and $7.3 million for operating years 2010, 2011 and 2012 respectively. The consulting team also believes a "new" service in 2011 will incur substantial start-up costs for vessel repositioning, vessel and terminal modifications, staffing, marketing, sales, advertising and reservations.

5.3.3 Option 1(b): Used Ropax (Dig-SJ) + Seasonal High Speed (Yar-BH only)

In terms of our evaluation criteria, the commentary concerning Digby-Saint John in the section above applies and will not be repeated in this section. The remaining portions of this section will therefore deal with a dedicated seasonal high speed service to Bar Harbor only.

5.3.3.1 Fishing Industry Time Sensitivity

While capable of rapid transit times, a high speed vessel has relatively low deadweight carrying ability, therefore restricting the total number of commercial units it can handle. Seafood shipments, with their associated odours can also cause compatibility issues with passenger/tourism traffic.

5.3.3.2 Tourism Impacts

From 1998 to 2006, the high speed service has been offered by Bay Ferries, up to 165,000 passengers have taken this crossing annually. This compares to a level of less than 80,000 for the combined 2009 Bar Harbor/Portland service rotation. Some of the passenger traffic are in day cruise mode only (approximately 20 percent), and should volumes experienced prior to 2006 return, this would be a substantial boost to the Yarmouth area tourism sector. For impact and financial calculations, the consulting team has, however, conservatively assumed that the service would capture the level of traffic forecast for the combined Bar Harbor and Portland crossings. As a result, the impact on tourism in the study area will be similar to that experienced in 2009.

5.3.3.3 Reliability

See discussion in Section 5.3.2.3.

5.3.3.4 Frequency

The frequency of sailings during the peak season could be twice per day, therefore doubling the number of crossings in 2009. This would also double the available capacity on this route.

5.3.3.5 Passenger Comfort

See discussion in Section 5.3.2.5

5.3.3.6 Network and Economic Productivity Benefits

Little impact would result from this configuration since there would be very little commercial traffic handled.

5.3.3.7 Environmental Considerations

See discussion in Section 5.3.2.7

5.3.3.8 Commercial Viability

Based on the traffic assumption made in 5.3.2.8 above and our estimate of operating expenses, annual deficits of approximately $11.8 million per year would occur under this scenario. However, should traffic levels increase by 50 percent (this would actually be a 20 percent reduction from the levels experienced in 2005), the deficit would be reduced to the $7.0 million range. Given the revenue growth potential, it is recommended that this option be subjected to more detailed assessment.

5.3.4 Option 1(c): Used Ropax (Dig-SJ) + Used Seasonal Ropax (Yar-BH only)

Most of the commentary concerning the Digby-Saint John option contained in Section 5.3.2 applies here unless otherwise noted. For analytical purposes, it has been assumed that a used ropax for service between Yarmouth and Bar Harbor could be in place for the 2011 operating season without extensive modifications.

5.3.4.1 Fishing Industry Time Sensitivity

For fishing-related traffic originating in the Yarmouth area this is a comparable, if not slightly better, option in terms of the time required in getting product to market. After an approximate 6-hour sailing to Bar Harbor and an hour long highway trip to Bangor, trucks would be on the Interstate Highway System. This could save at least an hour compared to travelling from Yarmouth to Bangor using the Digby-Saint John ferry service, even though the Bar Harbor to Bangor highway is a local road with multiple accesses and speed restricted zones.

Commercial vehicles carried on a direct service to the U.S., however could be subject to both the 24 hour notice and Harbor Maintenance Fee requirements in the U.S., although the latter do not apply to "ferry" services. The latter fee is based on 0.125 percent of the value of the shipment, which could add to the cost of using a waterborne connection. Fish packers like to load their product on the day it is caught, so would have difficulty meeting a 24 hour notification requirement for shipments by sea.

However, it would not be a convenient option for back haul traffic sourcing cargoes in Quebec and other parts of central Canada. Furthermore, seafood shipments taken on this vessel would be traffic and revenue now carried on the Digby-Saint John service.

5.3.4.2 Tourism Impacts

It is assumed that the seasonal ropax to Bar Harbor would take the same amount of traffic forecast for the continuation of the 2009 Yarmouth-Maine service in aggregate. It is likely there would be less day cruise traffic as the length of the day cruise would be doubled and allow for little time in Yarmouth, but otherwise the impact on tourism in the study area should be the same as discussed in Section 5.3.3.2.

5.3.4.3 Frequency

Only one daily peak season sailing would be possible, making it less desirable than the dedicated high speed service to this port, which has the potential to provide two sailings daily.

5.3.4.4 Passenger Comfort

As a conventional ship, some passenger comfort improvements compared to a high speed alternative are anticipated.

5.3.4.5 Network and Productivity Enhancements

Some highway travel distance savings will be provided by this option but given that it would run seasonally the total amount of savings would not be substantial.

5.3.4.6 Environmental Considerations

With a relatively modern vessel, some savings in GHG should occur compared to the approximately 1,000 km of highway travel that would be incurred otherwise.

5.3.4.7 Commercial Viability

It is expected there would be some commercial traffic that would take the seasonal ropax to Bar Harbor that is currently taking the Digby-Saint John service. This would reduce revenue (and increase contributions) on the latter service by approximately $0.6 million.

The estimated deficit for the Yarmouth-Bar Harbor seasonal ropax, assuming a used vessel valued at approximately $50 million is in the vicinity of $11.0 million per annum. This figure is comparable to the dedicated high speed option but the consultants believe there is limited growth potential for this option. Compared with the high speed alternative, it does not have an attractive value proposition. In addition, it would compete for some commercial traffic that is currently using the Digby-Saint John service. This option is not recommended for further study.

5.3.5 Option 1(d): Used Ropax (Dig-SJ) + Used Seasonal Cruise Ferry (Yar-Port)

The commentary concerning Digby-Saint John is very similar to that contained in Section 5.3.2, unless otherwise noted.

5.3.5.1 Fishing industry Time sensitivity

This vessel would be capable of taking commercial vehicles. When the *Scotia Prince* offered a similar service prior to 2005 some commercial traffic was handled, but mostly on the return voyage. However, the length of sailing provides limited, if any, time savings compared with highway travel. Some highway operating expense savings may result, though. It has been assumed that a limited number of commercial units would take this crossing if it was provided.

5.3.5.2 Tourism Impacts

The consulting team has assumed that the traffic levels forecast for a continuation of the 2009 Maine services could be attracted to this service. As a cruise ferry, however, up to 50 percent of this traffic is expected to be in 24 hour cruise mode, which would weaken the tourism impacts on the study area. The traffic forecast is a very conservative estimate (about one half) of volume compared to previous *Scotia Prince* levels, however, so some upward potential certainly exists.

5.3.5.3 Frequency

With an assumed frequency of five times per week during peak season, sailing frequency would be one of the weaker components of this service option. (However, *Scotia Prince* operated six sailings per week).

5.3.5.4 Passenger Comfort

The combination of conventional displacement ship motion effects and cruise ferry amenities, would provide higher levels of passenger comfort than ropax or high speed vessel options.

5.3.5.5 Network and Productivity Effects

See section 5.3.4.5 above.

5.3.5.6 Environmental Considerations

With relatively modern engines some GHG emission improvements should result.

5.3.5.7 Commercial Viability

Based on a $50 million used cruise ferry, and associated operating expenses and revenues, the annual deficit associated with this service option is anticipated to be in the range of $5.0 million per year. (These estimates also assume Canadian crews, rather than much less expensive foreign crews previously employed by Prince of Fundy Cruises). While there will be a slight leakage of commercial traffic from the Digby-Saint John service, the operating deficit is relatively low and there is some upward potential in traffic levels. It is therefore recommended that this option be subjected to more detailed assessment below.

5.3.6 Options 1(e) to 1(h): New Ropax (Dig-SJ) + Various Configurations (Yar-ME)

In terms of evaluation parameters, the provision of a new ropax for the Digby-Saint John service would add approximately $7 million to the annual cost profile. It is expected that the introduction of a new vessel would stimulate passenger traffic levels by at least an additional five percent compared to a used ropax replacement option. Based on experience in other situations, this modest growth can be expected to hold, assuming the service is cost competitive and attractive to the marketplace.

5.3.7 Option 2: Ferry Service at Yarmouth Only

On the presumption that ferry service between Digby-Saint John would no longer be supported, Yarmouth-only ferry service options should include the capability of handling commercial traffic year-round as well as peak season passenger traffic. There are a number of ways of accomplishing these objectives. The consulting team has chosen four separate service options for analysis:

- **Option 2(a)** - A year-round ropax service from Yarmouth to Bar Harbor, with a $50-million used vessel. Implementation of this option could occur as early as 2011.
- **Option 2(b)** - A seasonal high speed vessel between Yarmouth and Bar Harbor.

- **Option 2(c)** - A seasonal ropax between Yarmouth and Bar Harbor with dedicated roro freight service between Yarmouth and Gloucester Massachusetts. The used ropax is assumed to cost $50 million and the used roro will cost $10 million.
- **Option 2(d)** - A seasonal used cruise ferry from Yarmouth to Portland (assumed purchase price of $50 million) with capability of handling limited amounts of commercial traffic and a year-round roro service to Gloucester, Massachusetts.

5.3.8 Option 2(a): No Digby Service + Year Round Ropax (Yar-BH)

For fishing-related traffic originating in the Yarmouth area this is a comparable, if not slightly better option in terms of time getting product to market. After an approximate 6-hour sailing to Bar Harbor and an hour long highway trip to Bangor, trucks would be on the Interstate Highway System. This could save at least an hour compared to travelling from Yarmouth to Bangor using the Digby-Saint John ferry service, even though the Bar Harbor to Bangor highway is a local road with multiple accesses and speed restricted zones.

When year-round commercial service was offered between Yarmouth and Bar Harbor in the 1980s, commercial vehicle volume averaged 3,367 units per annum from 1986-1995. One must remember, though, that the Digby-Saint John service was operating at this time and offered up to three trips per day during peak travel season and two trips per day in the non-peak season. From 1983-1993, the Digby-Saint John service carried an average of 23,256 commercial units per annum. The *Scotia Prince* also operated in the summer months and truckers used this service on the overnight return leg. Without solid origin/destination data it is assumed that approximately 50 percent of the commercial traffic now travelling on the Digby-Saint John service would use the Yarmouth ropax. However, the Bar Harbor routing may not be attractive to truckers hauling fish traffic to Boston and picking up back haul traffic in Quebec, especially compared to the Digby-Saint John service.

5.3.8.1 Tourism Impacts

In 2011, for purposes of this analysis, it is assumed the type of vessel would be changed and there would no longer be service to Portland. At the same time, the Digby-Saint John service would no longer exist. Negative traffic impacts could come from no longer being able to access the Portland marketplace and from those customers who desired to experience a high speed vessel crossing. Some positive traffic impacts to Yarmouth would stem from the absence of the Digby-Saint John service, and a service dedicated to a single port pairing (it is believed that sailing to two Maine ports has caused some confusion in the market place). It is also assumed that the net impact would be modest growth over recent levels of Yarmouth passenger traffic.

While the Yarmouth area tourism traffic would experience gains over recent levels there would be an adverse impact on the Digby and Saint John areas. All the traffic that used to take the Digby-Saint John ferry service would be diverted to other locations and routings.

5.3.8.2 Reliability

See reliability discussion in Section 5.3.2.3.

5.3.8.3 Frequency

Sailings frequency would be once per day during the peak summer season and three times per week during the off peak season. As a consequence this would not compare favourably with the Digby-Saint John options.

If traffic conditions warranted, a daily service could be implemented year-round. However, the sailing distance is such that it would be very difficult to implement a twice daily service during the peak season unless they took place overnight.

5.3.8.4 Passenger Comfort

As stated in the evaluation parameters section, it is believed that ropax vessels generally provide greater passenger comfort than high speed passenger vessels, particularly when the latter vessels are on long voyages such as the Yarmouth-Portland crossing. As a consequence a passenger comfort improvement would occur in 2011 with the implementation of a ropax service.

5.3.8.5 Network and Economic Productivity Benefits

The Yarmouth-Bar Harbor ropax would save more road kilometres than the Digby-Saint John service. However, this option would only attract one-half the commercial traffic that the Digby-Saint John service does.

5.3.8.6 Environmental Considerations

As the used ropax vessel would have relatively new engine and propulsion systems, there is some potential for a net positive impact on GHG emissions compared to highway travel for the traffic moved on the ferry service.

5.3.8.7 Commercial Viability

With the implementation of a year-round used ropax in 2011, given traffic and operating parameters, it is estimated that the deficit would rise to approximately $10 million and remain at this level.

In our view, however, a new operation commencing in 2011 would incur substantial start-up costs. These would include vessel repositioning costs, potential vessel modifications, establishing a call centre, employee training, terminal and management staffing, marketing, sales and advertising. We estimate that these costs would amount to a minimum of $5 million, but they have not been explicitly factored into our analysis.

If both ferry and airline customs service ceased for a year, there is also the possibility that CBSA would charge the full cost of re-establishing and providing service from 2011 onwards.

5.3.9 Option 2(b): No Digby Service + High Speed (Yar-BH only)

Compared to the high speed option described in Section 5.3.3 there are very few differences.

5.3.10 Option 2(c): No Digby Service + Used Seasonal Ropax (Yar-BH only) + Used Roro (Yar-Glo)

5.3.10.1 Fishing Industry Time Sensitivity

The seasonal ropax would service the fishing industry in a reasonable fashion as discussed in Option 2 (a).

Based on sailing times (approximately 15 hours @ 15 knots and 13 hours @ 18 knots), the roro option to Gloucester does not provide any time advantages for fishing industry shipments. As well, since this would be a drop trailer (trailers-only) service, shippers/carriers would have to arrange for final delivery of product to the consignee. This situation is not conducive to achieving delivery of the freshest product to achieve the price advantage provided by an early arrival at the market.

As noted above, current backhaul patterns frequently involve truckers travelling to Quebec to obtain feed for mink farms. Neither the Bar Harbor ropax, nor the Gloucester roro service, would be conducive to these movements.

5.3.10.2 Tourism Impacts

Discontinuation of the high speed service to Bar Harbor and Portland in 2010 would lead to a truncation of tourism inflows via the ferry service to Yarmouth for at least a whole year.

In the scenario being analysed here, the seasonal ropax to Bar Harbor and the absorption of some of the Digby-Saint John traffic in 2011 (commensurate with the latter service's cessation) would stimulate tourism activity in the Yarmouth area. There would be a significant negative impact in both Digby and Saint John from no longer having a ferry service.

5.3.10.3 Frequency

With summer season offerings of 10 sailings per week (7 from the Bar Harbor ropax and 3 from the Gloucester roro), the frequency of sailings would be considerably reduced from the 14 sailings currently available on the Digby-Saint John ferry service. For the remaining portions of the year, 3 crossings per week from the roro are obviously fewer than the 7 available through Digby-Saint John.

5.3.10.4 Passenger Comfort

From 2011 forward, with the seasonal ropax availability, some improvement in passenger comfort could be achieved, particularly in comparison with the high speed crossing to Portland.

5.3.10.5 Network and Economic Productivity Effects

The potential distribution of commercial traffic between the Bar Harbor ropax and the Gloucester roro during the summer season is uncertain. It is therefore not possible to calculate possible benefits to shippers/carriers. Given difficulties with the timing of product delivery and freshness it is conceivable that the roro impacts would be neutral or negative.

5.3.10.6 Environmental Considerations

Depending on the age of engine technology in the used vessels analysed in this option, it is likely that there would be positive impacts on GHG emissions.

5.3.10.7 Commercial Viability

In 2011, assuming a modest amount of commercial traffic takes the ropax in the summer season to Bar Harbor, a deficit of approximately $6.9 million would be incurred on this service. This would stabilize around $7.5 million per annum in subsequent years. However, this calculation does not take into account any start-up costs, which we project to be at least $5 million.

Based on the roro taking about one-half of the commercial traffic currently travelling on the *Princess of Acadia* (one-quarter in the summer time), an annual deficit for this service of approximately $10 million would be incurred.

5.3.11 Option 2(d): No Digby Service + Used Seasonal Cruise Ferry (Yar-Port) + Used Roro (Yar-Glo)

5.3.11.1 Fishing Industry Time Sensitivity

Sailing times for both the seasonal cruise ferry to Portland and the year-round roro to Gloucester are similar. The cruise ferry option (notwithstanding some possible incompatibility with passengers emanating from fish odours/melt water) would provide slightly better performance since loading and unloading would not need to be done using yard tractors. Scheduling the service to suit the needs of tourists and the fishing industry could also be an issue, since seafood shippers would require an early morning arrival to obtain the best market prices in Boston.

Compared to either Digby-Saint John or Yarmouth-Bar Harbor this option is definitely less suitable for getting fresh fish to the marketplace. As well, it does little to support the emergent backhaul cargo sources currently located in Quebec.

5.3.11.2 Tourism Impacts

With five trips per week in the peak summer season, it is assumed that the cruise ferry could attract reasonable passenger traffic volumes from Portland and locations further south. The portion of traffic which would be in cruise mode (i.e. unaccompanied by vehicles and using cabins), compared to using the service in a ferry capacity is unknown. When Prince of Fundy Cruises operated a similar service it attracted about 50,000 such passengers per annum, however, its "heyday" came before the recent growth in short 4-5 day New York and Boston-based cruises to Saint John, Halifax and Sydney. In terms of tourism impacts in Yarmouth, it must be recognized that those who would be using the service as a 24-hour cruise would access local facilities only for the length of the layover in Yarmouth.

Based on a 2011 cessation of the Digby-Saint John service, there would be some limited diversion of traffic from this crossing to the cruise ferry. The extent of this diversion is considered to be somewhat limited by the nature of amenities available and corresponding

upscale tariffs for them, although with competition from the aforesaid cruise industry, tariffs would need to be kept competitive.

For the Yarmouth area it is likely that tourism impacts for a seasonal cruise ferry to Portland would be slightly less than with a seasonal ropax to Bar Harbor, although this would depend upon the amount of "packaging" the vessel operator offered with the local tourism industry. As noted with all the Yarmouth-only options, there would be a very negative impact in the Digby and Saint John areas with no ferry service.

5.3.11.3 Frequency

The frequency of the cruise ferry would be five times per week in the late June to early September period and three times per week for the remainder of the May to October operating period. Prior to 2005, the *Scotia Prince* cruise ferry was able to offer six crossings per week but needed the seventh day to perform maintenance functions and to provide staff rest periods. A six times per week service is considered to be on the threshold of achievability however, depending on the speed of the vessel.

The Gloucester roro service would operate three round trips per week year-round.

Compared to Yarmouth-Bar Harbor and Digby-Saint John options the frequency of sailings from Option 2 (d) is not attractive, especially to seafood shippers.

5.3.11.4 Passenger Comfort

The combination of conventional displacement ship motion effects and cruise ferry amenities would provide higher levels of passenger comfort than ropax or high speed passenger options.

5.3.11.5 Network and Economic Productivity Effects

Benefits to commercial trucking interests would be lower than Option 2 (d) and Digby-Saint John options.

5.3.11.6 Environmental Considerations

Based on newer engine technology and the proportion of vehicles removed from the roadways by both the cruise ferry and the roro, there would be some GHG emission benefits produced.

5.3.11.7 Commercial Viability

The initial capital cost of the used cruise ferry is estimated at $50 million. To provide service levels consistent with a cruise-like environment, crew levels would also need to be substantially boosted (a crew level of 100 versus a level of 25 for a ropax is assumed). It is further assumed that tariffs could be raised by a factor of 15 percent in this market, although the operator will have to be mindful of cruise industry competitors, which offer a broad range of sailings from downtown New York, and across the harbour in New Jersey, direct to the Maritimes.

Based on cost and revenue attributes the cruise ferry would incur a deficit of approximately $5.0 million per year, not including start-up costs. (As noted in a previous section above, this scenario assumes 100 percent Canadian crew. A foreign crew would produce considerable savings).

The roro to Gloucester would incur 2011 and 2012 deficits of $9.8 million per year.

5.3.12 Option 3: Ferry Service at Digby Only

Compared to the existing ropax service provided by the *Princess of Acadia* there are a number of vessel and service options that could be considered between these two locations. The potential segregation of passenger and commercial traffic has been studied in the past without encouraging results.[69] For instance, a dedicated tug and barge operation was anticipated to incur an annual deficit in the $6-$7 million range annually by itself, with additional funds required to maintain a passenger connection (either conventional ropax or high speed).

We therefore believe the most practical option for this service is the continuation of a ropax service.

5.3.13 Option 3(a): Used Ropax (Dig-SJ) + No Yarmouth Service

The evaluation criteria discussion contained in Section 5.3.2 pertaining to the Digby-Saint John service for the following elements: fishing industry time sensitivity, reliability, frequency, passenger comfort, network and economic productivity impact and environmental considerations, also applies to this option and will not be repeated.

5.3.13.1 Tourism Impacts

The incremental tourism traffic which could move from the Yarmouth ferry service to the Digby-Saint John service would enhance tourism impacts in both the Digby and Saint John areas. However, a negative impact would occur in the Yarmouth area in 2010 if there was no ferry service in this location.

5.3.13.2 Commercial Viability

With cancellation of the Yarmouth service in 2010, the additional passenger spillover traffic to the Digby-Saint John ropax will enhance the financial picture for this service. As previously mentioned, the *Princess of Acadia* will likely be replaced by a chartered vessel in 2011. Charter hire fees and vessel modification expenses are noted in Section 5.3.2.8. With some spillover traffic from Yarmouth, longer term annual deficits for this service will be about $0.5 million per year lower than Option 1(a).

5.3.14 Option 3(b): New Ropax (Dig-SJ) + No Yarmouth Service

The essential difference between this option and Option 3(a) discussed above is that the cost of replacement vessel would rise from approximately $6.7 million to approximately $13.4 million per annum and there would be an additional 5 percent stimulus to passenger traffic upon the introduction of a new vessel. As per above, this increase would be expected to be maintained after a new vessel was introduced.

[69] Opus International, "Saint John to Digby Ferry Service – Service Option Alternatives", Transport Canada, 2007.

Projected deficits for 2010 and 2011 are the same as Option 3(a) but the longer term operating deficit is expected to rise to the $16.1 million range per annum.

5.3.15 Synopsis of Digby Only Service Options

Even though the financial picture of the Digby-Saint John ferry service would be improved by the closure of the Yarmouth ferry service, it would still not be commercially viable.

While commercial trucking operations would maintain a high degree of access to primary fishing industry markets and related backhauls, the tourism industry in Yarmouth would be negatively impacted.

Because of the cancellation of the Yarmouth service in 2010, however, a Digby option is the "new" status quo and is subjected to further study below.

5.3.16 Option 4: Alternating Ferry Service at Digby and Yarmouth

The use of a single adaptable vessel would be the most likely option to address this scenario. A ropax service to Bar Harbor in the summer and then repositioning this vessel to Digby-Saint John in the winter would be the most practical solution from an operating perspective. This option is identified as Option 4.

5.3.17 Option 4: Ropax (Dig-SJ in Winter & Yar-BH in Summer)

5.3.17.1 Commercial Viability

The consulting team believes that a very limited percentage of Digby-Saint John passenger traffic would shift to the Yarmouth-Bar Harbor service during peak summer months. Furthermore, only operating the Digby-Saint John service during off-peak seasons would have a negative impact on established travel patterns and cause a reduction in off-season usage. It is expected that a reasonable share of outbound fish traffic could be retained, but the current backhaul movements from Quebec would not be well served. Commercial traffic growth, particularly intermodal cargo that could move via Saint John, (which is subject to ongoing initiatives), would also not occur.

One upside from this scenario would be increased peak season revenue with limited incremental operating expense. The enhanced revenue profile would have to be balanced against greater administrative and terminal maintenance expenses.

The consulting team estimates that the annual operating deficit for this scenario would settle in the $13.5 million range. This figure is approximately $1.5 to $2.0 million per year higher than a year round Digby-Saint John service.

5.3.17.2 Evaluation

While technically feasible, this option is not recommended for further study because:

- The tourism industry in the Digby area would be very negatively impacted;

- Commercial trucking industry concerns would need to adapt to alternate routing for front haul and back haul situations, depending on the season;
- Four separate terminal locations and loading docks would need to be maintained; and
- Part time, or repositioned, employees would be needed to provide shore-related activities.

5.3.18 Option 5: Short Sea Shipping from Yarmouth

This section analyses a potential short sea roro service between Yarmouth and Gloucester, Massachusetts.

5.3.19 Option 5: Used Roro (Yar-Glo)

5.3.19.1 Evaluation

All the parameters of this option are discussed in Section 5.3.10. Because of scheduling and frequency issues, it provides little advantage for seafood-related traffic and existing backhaul routings would suffer from limited service frequency.

This option provides potential users with limited benefits and comes with high annual deficits approximating $11.8 million, and is not recommend for further study.

5.3.20 Summary of Screening Analysis

A number of observations are apparent from the evaluation of ferry service options:

- None of the Bay of Fundy ferry service options examined are commercially viable with, or without, the cost of vessel capital included. As a consequence, the continuation of ferry service(s) would require capital and operating support;
- Yarmouth-only, or Digby-only, ferry service options contain negative consequences for either port; and
- Cancellation of Bay Ferries' high speed Yarmouth-Maine service in 2010 effectively entails a Digby-only ferry service, at least for 2010, and as such contains negative consequences for Yarmouth.

Based on the discussion surrounding the various options contained in this chapter, the following seven options have been shortlisted for further investigation in Section 5.4:

Opt 1(a): Used Ropax (Dig-SJ) + High Speed Ferry (Yar-BH & Port)

Opt 1(b): Used Ropax (Dig-SJ) + High Speed Ferry (Yar-BH only)

Opt 1(d): Used Ropax (Dig-SJ) + Seasonal Cruise Ferry (Yar-Port)

Opt 1(f): New Ropax (Dig-SJ) + High Speed Ferry (Yar-BH only)

Opt 1(h): New Ropax (Dig-SJ) + Seasonal Cruise Ferry (Yar-Port)

Opt 3(a): Used Ropax (Dig-SJ) + No Yarmouth Service

Opt 3(b): New Ropax (Dig-SJ) + No Yarmouth Service

Note: *Option 1(a), which is representative of the 2009 configuration, has been included to obtain an estimate of impacts for the "no ferry service" scenario*.

5.4 Detailed Ferry Configuration Options Analysis

The purpose of this section is to provide a more detailed assessment of each of the seven shortlisted options identified at the conclusion of Section 5.3. For each option, this assessment will establish:

- Passenger, passenger vehicle, and commercial vehicle traffic (and associated revenues) that would potentially use the option in question over the next 10 years;
- An estimate of annualized capital and operating costs for each option. (Differences between operating/capital costs and user revenues will be noted); and
- Benefits and costs that would accrue to the study area over the next 10 years.

Operating and terminal expenditures have been prepared using a variety of information sources, including historical data provided by various levels of government and private operators. Economic impact values should be recognized as order of magnitude estimates given the limitations of the supporting data. A wide variety of service options are assessed. However, precise indicators of transportation demand, expenditure impacts, and future tourism demand or projections are not available for each of these options.

Note: The study team was also asked to examine the implications of having no ferry service at either Digby or Yarmouth. The impacts of this scenario were estimated by eliminating the respective benefits offered by Option 1(a) below (i.e. the 2009 configuration).

5.4.1 Option 1(a): Used Ropax (SJ-Dig) + Seasonal High Speed (Yar-BH & Port)

This option is representative of the 2009 ferry configuration which saw year-round service between Digby and Saint John provided by the *Princess of Acadia*, and seasonal service between Yarmouth and Bar Harbor/Portland provided by the *CAT*.

Digby-Saint John Ropax

5.4.1.1 Traffic and Revenue Forecast

Traffic forecasts for the Digby-Saint John service were provided in *Working Paper 2: Analysis of Trade Flows and Traffic Patterns*. These forecasts were originally prepared for Transport Canada in November 2009 for an economic impact assessment update and presumed the continuation of the *Princess of Acadia* service for an indefinite period. Given the advanced age of the *Princess of Acadia*, it is assumed that this vessel will need to be replaced in the very near future. In recognition of this, our analysis assumes a used (5-10 years of age) ropax charter vessel will replace the *Princess of Acadia* in 2011, followed by the purchase of a used ropax for the 2012 operating season.

There is evidence that new or newer vessels, because of more modern attributes and operating characteristics, frequently stimulate demand.[70] Traffic and revenue stimulus of 25 percent or more, is possible given improved vessel amenities and marketability. The study team has conservatively estimated that passenger and passenger vehicle traffic will increase by 5 percent in 2012 because of the introduction of the newer vessel. This 5 percent adjustment to the 2010 to 2019 traffic forecasts contained in Working Paper 2 has been incorporated in Figure 5-9.

Figure 5-9 also contains revenue estimates for each traffic component. These calculations have been made assuming continuation of the 2009 tariff (see previous discussion on rate sensitivity in Section 5.1.6). An estimate of ancillary revenue from on board vessel services is also included using financial data provided by the current operator.

Figure 5-9: Forecast Traffic and Revenue for Option 1(a): Digby-Saint John Ropax

Year	PAX	PAX Rev. $mil	Passenger Related Vehicles	PRV Rev. $mil	Commercial Related Vehicles	CRV Rev. $mil	Ancillary Rev. $mil	Total Revenue $mil.
2010	111,400	$2.785	31,900	$2.712	10,400	$3.640	$.660	$9.797
2011	118,200	$2.955	33,800	$2.877	12,000	$4.200	$.700	$10.732
2012	119,400	$2.984	34,200	$2.906	13,500	$4.725	$.707	$11.322
2013	120,600	$3.014	34,500	$2.935	13,600	$4.760	$.714	$11.423
2014	121,800	$3.044	34,900	$2.964	13,800	$4.830	$.721	$11.560
2015	123,000	$3.075	35,200	$2.994	13,900	$4.865	$.729	$11.662
2016	124,200	$3.106	35,600	$3.024	14,100	$4.935	$.736	$11.800
2017	125,500	$3.137	35,900	$3.054	14,200	$4.970	$.743	$11.904
2018	126,700	$3.168	36,300	$3.084	14,300	$5.005	$.751	$12.008
2019	128,000	$3.200	36,700	$3.115	14,500	$5.075	$.758	$12.148

5.4.1.2 Capital and Operating Costs

Figure 5-10 contains capital and operating cost estimates for all major service parameters for the 2010 to 2019 operating period.

Vessel cost estimates are derived from the consulting team's database of comparable ships and from Bay Ferries' financial data. The capital cost of the replacement ropax has been estimated at $50 million. Transport Canada provided the consulting team with two scenarios under which a *Princess of Acadia* replacement vessel would be procured, both used and new (for discussion

[70] There is considerable evidence to support this assertion within the Atlantic Region. When the new "Bluenose" entered service in 1983, traffic jumped from about 90,000 passengers to 127,000; when the "Caribou" was introduced into the North Sydney-Port aux Basques service, traffic increased from 278,000 to 304,000 passengers; when the "Smallwood" was introduced in 1989 it increased again from 356,000 to 384,000; on the Souris-Magdalen Islands service, the introduction of the "Madeleine" in 1997 saw traffic increase from 48,000 to 62,000 passengers. The most recent example is when the first Cat was introduced between Yarmouth and Bar Harbor in 1998, when passenger volume increased from 82,135 to 153,667. There are many more recent examples of this phenomenon in Europe.

of new option see below Section 5.4.4).[71] The scenarios provided by Transport Canada indicated that if it was replaced by a used $50 million vessel, a charter would be required in 2011 while a used vessel was secured. The vessel would need approximately $10 million in modifications and this charter would cost $1 million per month for 18 months. The charter party agreement would contain a lease-purchase option. These charter costs were used in our analysis. However, analysis not including these charter costs would result in a higher benefit-cost ratio.

Fuel expenditures have been estimated using current market prices (approximately $800 per tonne). During the past decade, there has been substantial volatility in petroleum markets. As well, there are clean fuel initiatives planned for implementation in North America as early as August 2012. Cleaner (lower sulphur) fuels will come with a price premium estimated to be in the 5-10 percent range. Based on a 10 percent change in fuel prices, an incremental operating cost impact of approximately $0.5 million per year will be experienced.

Maintenance costs for a vessel will generally increase with age, particularly after 10 years of service. Without knowing the age and condition of the used ropax contemplated for use on the service, it is difficult to adjust the maintenance expenditure profile. Routine and variable maintenance have been estimated at $2.0 million per annum for the first two years of Digby-Saint John service, increasing to $3.0 million per annum by 2020.

Terminal and administration costs are estimated from the same sources noted above. Terminal maintenance costs for individual terminals were provided by Transport Canada for the 2010 to 2014 period. Terminal maintenance expenses for 2015 and beyond, following an inspection survey, have been established at $2.0 million per year. This figure is 2 percent of the estimated $100 million replacement value of terminal assets. Contingency expense allowances of $500,000 for both the vessel and terminals have also been added to maintain a conservative position in the estimation process.

Cumulative annual expenses are compared to estimated revenues at the bottom of Figure 5-10. The present value of total expenses and revenues and the difference between expenses and revenues over the ten year operating period is also calculated using a 10 percent discount rate. The present value of net costs approximates $91.0 million over the period in question.

[71] Whether these two options are the most cost competitive or provide the most value for the investment required, has not been determined. Further investigation of vessel procurement options is recommended.

Figure 5-10: Projected Expenses for Option 1(a): Digby-Saint John Ropax ($2010 millions)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Vessel											
Capital / Interest	16.000	12.000	6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	59.375
Fuel	3.500	5.544	5.544	5.544	5.544	5.544	5.544	5.544	5.544	5.544	35.428
Crew	2.829	2.829	2.829	2.829	2.829	2.829	2.829	2.829	2.829	2.829	19.121
Maintenance	2.500	2.000	2.000	2.250	2.250	2.500	2.500	2.750	2.750	3.000	16.128
Lay-Up Costs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*25.329*	*22.873*	*17.567*	*17.817*	*17.817*	*18.067*	*18.067*	*18.317*	*18.317*	*18.567*	133.432
Terminal & Admin											
Labour	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	8.787
Maintenance	1.092	0.708	1.378	0.501	4.431	2.000	2.000	2.000	2.000	2.000	11.456
Administration	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	10.139
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*4.392*	*4.008*	*4.678*	*3.801*	*7.731*	*5.300*	*5.300*	*5.300*	*5.300*	*5.300*	33.760
Total Expenses	***29.721***	***26.881***	***22.245***	***21.618***	***25.548***	***23.367***	***23.367***	***23.617***	***23.617***	***23.867***	***167.192***
Revenue	***9.797***	***10.732***	***11.322***	***11.423***	***11.560***	***11.662***	***11.800***	***11.904***	***12.008***	***12.148***	***76.153***
Expenses - Revenue	***19.924***	***16.149***	***10.923***	***10.195***	***13.988***	***11.705***	***11.567***	***11.713***	***11.609***	***11.719***	***91.039***

5.4.1.3 Net Economic Impacts of the Digby-Saint John Ferry Service

Economic impacts for the Digby-Saint John ferry service have been calculated in a benefit-cost framework. The standard methodology for determining impacts is a comparison with a "no service" situation. The impact on commercial truckers for instance, is a comparison of road/ferry travel (with a ferry service) to all road travel (with no ferry service).

Impact categories from the November 2009 study[72] for Transport Canada were utilized for the present study. The November 2009 base amounts in each category have been adjusted for revised traffic numbers and converted to 2010 dollars. The respective amount for each impact category for each year of the study period is delineated in Figure 5-11. The present value of the impact stream, based on a discount rate of 10 percent, is noted in the final column of the figure.

A brief description of each impact category (more detailed methodology statement from the November 2009 report is contained in Appendix D) and associated estimation parameters, is contained below:

- Commercial Traffic - In the absence of the ferry service, commercial truck traffic would be forced to drive an estimated 570 kilometres from Digby to Saint John. The incremental costs attached to this travel have been quantified for the forecasted volume of commercial traffic over the 2010 to 2019 analysis period. Starting from a level of $6.4 million in 2010 ($2010) this impact grows to an estimated $8.9 million in 2019 ($2010). The present value of this stream of impacts is $54.5 million.

- Tourism Impacts - Market research undertaken on behalf of Bay Ferries indicates that approximately 20 percent of tourism travel would not occur in the absence of the ferry service. Non-resident visitation expenditures were estimated using information from Bay Ferries' market research and the Nova Scotia Department of Tourism and Culture. An annual impact of $5.2 million is estimated in 2010 rising to $6.0 million in 2019. Owing to length of stay factors, it is estimated that 75 percent of this impact occurs in Nova Scotia and the remainder in New Brunswick. The present value of tourism impacts is $38.2 million.

- Passenger Traffic - Additional driving and travel time costs for all passenger traffic elements (such as VFR and business travellers), still making the trip between Digby and Saint John, will be incurred. These costs were estimated using mid-size vehicle costs and average wage data. An impact of $4.2 million is estimated for 2010 rising to $4.8 million in 2019. The present value of these impacts over the 2010 to 2019 period is $30.7 million.

- Accident Costs - Additional highway traffic resulting from a ferry service closure is assumed to have an accident profile similar to existing highway traffic in the study area. Thus, additional highway accidents would occur. Accident rates for property damage

[72] Opus International Consultants (Canada) Ltd., "Digby to Saint John Ferry Service: Economic Impact Assessment Update", Transport Canada, 2009.

only, injury, and fatal accidents were applied to the extra traffic element, producing an annual impact of $0.64 million in 2010. This would rise to $0.79 million in 2019. The present value of accident impacts for the study period is $4.9 million.

- Greenhouse Gas (GHG) - Bay Ferries has provided the consulting team with the current fuel consumption levels of the *Princess of Acadia*. These have been compared to fuel consumption levels of passenger and commercial vehicles, had highway travel occurred instead. The *Princess of Acadia*, despite operating at very efficient speeds (vessel fuel consumption is very sensitive to operating speed), is currently consuming more fuel than passenger/commercial vehicles, if the latter had to drive between Digby and Saint John. Fuel consumption for the used ropax replacement of the *Princess of Acadia* in 2012 is estimated to be higher still if the replacement vessel is run at 80-85% of maximum speed. If run at a speed of 14 knots, however, a 5-10 percent saving in fuel consumption could be achieved compared to the *Princess of Acadia*. Because of the variance related to speed of operations it has been assumed that the current differential in GHG emission costs would be maintained throughout the study period. The present value of this impact is a negative $0.22 million for the study period.

- Ferry Service Employment - Wages paid to Bay Ferries' operating personnel have been estimated at approximately $4.3 million in 2010. The economic impact of losing these wages has been calculated using assumed opportunity costs in New Brunswick and Nova Scotia (Note: an opportunity cost is the value from the next best allocation of resources). An annualized impact of $0.814 million for the study period with a present value of $5.5 million is calculated.

- Other Service Expenditures - Purchase of local goods and services also has an economic impact in the study area. A calculation of the impact of non-fuel expenditures assuming regional leakage factors and a blended opportunity cost has been made. It is estimated that the impact of these expenditures approximates $1.02 million in 2010 and all subsequent years, which yields a present value of $6.9 million over the study period.

- Tourism Information Centre - A seasonal tourism information centre is located in Digby. Without the ferry service, Digby would no longer be an entry point to Nova Scotia. The consulting team assumes this centre would no longer be operated, resulting in the loss of associated employment and wages. Following application of an opportunity cost, this impact is estimated at $0.04 million per year. A present value of $0.27 million for the duration of the study period is calculated.

5.4.1.4 Summary

Projected expenses associated with continuation of the Digby-Saint John ferry service are estimated to have a present value of $167.2 million in $2010 over the 2010 to 2019 period. Operating revenues over the same period are estimated to have a present value of $76.2 million. The difference between expenses and revenues during the 2010 to 2019 period has a present value of approximately $91.0 million. In undiscounted terms, annual subsidies are projected to average $11.7 million (coincident with the purchase of a used ropax).

The present value of direct benefits from continued operations of the Digby-Saint John ferry service is estimated to be $140.9 million. Benefits are principally from three categories;

commercial trucking ($54.5 million), the tourism industry ($38.2 million) and reduced passenger vehicle operating costs ($30.7 million).

With the parameters above, a benefit-cost ratio of 1.5 results - an expenditure of $91.0 million is required to achieve benefits of $140.9 million.

Figure 5-11: Projected Net Economic Impacts for Option 1(a): Digby-Saint John Ropax ($ millions)

Economic Impact	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Commercial Traffic	6.405	7.352	8.294	8.376	8.460	8.545	8.630	8.717	8.804	8.892	54.543
Tourism Impacts	5.222	5.541	5.596	5.652	5.708	5.766	5.823	5.881	5.940	6.000	38.230
Passenger Traffic	4.200	4.456	4.501	4.546	4.591	4.637	4.684	4.730	4.778	4.825	30.748
Accident Costs	0.640	0.698	0.735	0.742	0.749	0.757	0.765	0.772	0.780	0.788	4.947
GHG Emissions	-0.030	-0.032	-0.032	-0.032	-0.033	-0.033	-0.033	-0.034	-0.034	-0.034	-0.220
Ferry Service Employment	0.814	0.814	0.814	0.814	0.814	0.814	0.814	0.814	0.814	0.814	5.502
Other Service Expenditures	1.020	1.020	1.020	1.020	1.020	1.020	1.020	1.020	1.020	1.020	6.894
Tourism Information Centre	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.270
CBSA Services	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Net Economic Impacts	**18.311**	**19.889**	**20.967**	**21.158**	**21.351**	**21.545**	**21.742**	**21.941**	**22.141**	**22.344**	**140.914**

Yarmouth-Maine High Speed Ferry

5.4.1.5 Traffic and Revenue Forecast

Traffic forecasts for the Yarmouth-Maine (Bar Harbor and Portland) service were provided in Working Paper 2 and are repeated in Figure 5-12 below.

Revenue for respective traffic elements, based on the most likely traffic scenario and a continuation of the 2009 tariff for 2010 is presented below. The revenue calculations presume an even split of traffic between the two ports of call in Maine. The study team has also provided an estimate of on board ancillary revenue.

Figure 5-12: Forecast Traffic and Revenue for Option 1(a): Yarmouth-Maine High Speed Ferry

Year	PAX	PAX Rev. $mil	Passenger Related Vehicles	PRV Rev. $mil	Commercial Related Vehicles	CRV Rev. $mil	Ancillary Rev. $mil	Total Revenue $mil.
2010	78,950	$4.934	26,300	$4.655	150	$.135	$2.500	$12.224
2011	80,550	$5.034	26,800	$4.744	150	$.135	$2.500	$12.241
2012	81,350	$5.084	27,100	$4.797	150	$.135	$2.500	$12.516
2013	82,150	$5.135	27,350	$4.845	150	$.135	$2.500	$12.615
2014	83,000	$5.187	27,600	$4.893	150	$.135	$2.500	$12.715
2015	83,800	$5.238	27,900	$4.942	150	$.135	$2.500	$12.815
2016	84,650	$5.291	28,200	$4.991	150	$.135	$2.500	$12.917
2017	85,500	$5.344	28,500	$5.041	150	$.135	$2.500	$13.020
2018	86,350	$5.397	28,750	$5.092	150	$.135	$2.500	$13.124
2019	87,200	$5.451	29,050	$5.143	150	$.135	$2.500	$13.229

5.4.1.6 Capital and Operating Costs

Figure 5-13 contains estimated capital and operating costs for all of the major service parameters for the Yarmouth-Maine service for the 2010 to 2019 period. Vessel cost estimates are derived from the consulting team's database of comparable ships. The estimated capital cost of the high speed vessel is $50 million financed over 20 years using an assumed cost of capital of 12 percent. (Note, there are no re-start or start-up costs included).

Maintenance costs have been estimated at approximately $1.5 million per year in 2010. Since this is a relatively new vessel this maintenance figure is sustained until 2013. Annual increments of $100,000 are added in 2013 and each subsequent year.

Figure 5-13: Projected Expenses for Option 1(a): Yarmouth-Maine High Speed Ferry ($ millions)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Vessel											
Capital / Interest	6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	45.245
Fuel	3.093	3.093	3.093	3.093	3.093	3.093	3.093	3.093	3.093	3.093	20.906
Crew	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	8.881
Maintenance	1.500	1.500	1.500	1.600	1.700	1.800	1.900	2.000	2.100	2.200	11.596
Lay-Up Costs	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	6.759
Other	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	6.759
Subtotal	*14.601*	*14.601*	*14.601*	*14.701*	*14.801*	*14.901*	*15.001*	*15.101*	*15.201*	*15.301*	100.146
Terminal & Admin											
Labour	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	6.759
Maintenance	2.468	0.631	1.170	1.748	1.475	2.000	2.000	2.000	2.000	2.000	11.508
Administration	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	16.898
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*6.468*	*4.631*	*5.170*	*5.748*	*5.475*	*6.000*	*6.000*	*6.000*	*6.000*	*6.000*	38.544
Total Expenses	***21.069***	***19.232***	***19.771***	***20.449***	***20.276***	***20.901***	***21.001***	***21.101***	***21.201***	***21.301***	***138.689***
Revenue	***12.224***	***12.413***	***12.516***	***12.615***	***12.715***	***12.815***	***12.917***	***13.020***	***13.123***	***13.229***	***85.677***
Expenses - Revenue	***8.845***	***6.819***	***7.255***	***7.834***	***7.561***	***8.086***	***8.084***	***8.081***	***8.078***	***8.072***	***53.013***

Outside of the approximate five-month operating window for the seasonal Yarmouth-Maine service, it is assumed that the vessel is in lay-up mode for the remainder of the year. An allowance of approximately $1.0 million per year is made for associated lay-up costs. In some years Bay Ferries have found winter season charters for the vessel in the Caribbean. Should this situation arise again, then lay-up costs would disappear and incremental revenue associated with winter deployment would need to be added.

A contingency of $1.5 million per year is allowed in each year of the planning period to account for any unforeseen vessel expenditures. Similarly, a contingency of $500,000 is assumed for terminal expenditures.

Capital maintenance items for terminals have been provided by Transport Canada. Routine maintenance is estimated at $0.3 million per year per terminal.

Cumulative annual expenses are compared to estimated revenues at the bottom of Figure 5-13. The present value of total expenses and revenues and the difference between expenses and revenues over the 10 year operating period is also calculated using a 10 percent discount rate. The present value of net costs approximates $53.0 million over the study period.

5.4.1.7 Net Economic Impacts

Economic impacts for the Yarmouth-Maine service have been calculated in a benefit-cost framework comparable to that used in the Digby-Saint John assessment. Impacts are measured on the basis of having a ferry service versus not having a ferry service. Figure 5-14 contains an annual estimate for each year of the study period with the present value (discount rate of 10 percent) noted in the final column. A brief description of each impact category and associated estimation parameters is contained below:

- Commercial Traffic - There are only about 150 commercial units (actually motorcoaches) handled on this crossing annually. The incremental cost of driving around for these units is estimated to be $0.2 million per year with a ten year present value of $1.3 million;

- Nova Scotia Tourism Impact - The question of whether the trip to Nova Scotia would be made in the absence of the Yarmouth-Maine ferry service has not been asked in Bay Ferries' annual market research reports. However, after examining trip purpose information (reduction in driving time - 62%, to experience the ferry - 17%) that was gathered, the consulting team believes that the proportion of people *not* making this trip, should there be no ferry service, would be considerably higher than the 20 percent recorded for Digby-Saint John. As a consequence, it has been assumed that 40 percent of existing non-resident visitation using the Yarmouth-Maine service would be lost if the ferry service was to cease. The amount of tourism expenditure impact, based on Nova Scotia Tourism and Bay Ferries' market research is estimated to be $5.0 million in 2010. This amount is assumed to increase in lock step with the projected change in passenger traffic volumes and has a present value of $35.2 million over the study period. (Note that an estimate for the impact upon tourism in Maine has not been made).

- Passenger Traffic - Additional driving and travel time costs for all passenger travel elements still travelling in the absence of the ferry service will be incurred. Traffic has been evenly apportioned to Yarmouth-Bar Harbor and Yarmouth-Portland pairings and respective distance and time calculations made. Incremental annual expenditures of $3.1 million are estimated with a present value of $22.2 million over the ten year study period. (Note this calculation includes travel both to and from Yarmouth regardless of the residence of the visitor). Should there be some philosophical reticence in counting the impacts of all travellers, it is noted that approximately 75 percent of the travellers using this service are from the United States and 24 percent are from Canada. The remainder are from other countries besides the United States or Canada.

- Accident Costs - Additional highway travel resulting from a ferry service closure is calculated to produce additional accidents valued at approximately $0.5 million per year. This impact will adjust annually based on the forecasted traffic and is estimated to have a present value of $3.5 million over the ten year period under consideration. (Note that this impact includes some travel occurring in the State of Maine).

- Greenhouse Gas Emissions - Fuel consumption for the high speed vessel used in 2009 was calculated to be approximately twice the level of fuel consumed by highway vehicles should they be forced to drive around. This is estimated to have a negative impact of approximately $0.04 million per year or $0.3 million in present value terms over the study period. This calculation also includes highway travel in the State of Maine.

- Ferry Service Employment – Once opportunity costs are deducted, an annual impact of $0.48 million is anticipated from loss of ferry service employment. The present value of this impact over the 2010 to 2019 period is $3.2 million.

- Other Ferry Service Expenditures - Purchase of other goods and services (excluding fuel, capital/interest and labour) are estimated to have an annual impact of $0.5 million in Atlantic Canada annually. The present value of this stream of impacts is approximately $3.6 million.

- Tourism Information Centre Employment - The continued operation of the Yarmouth visitor information centre would be in question if there was no ferry service. The 10 seasonal jobs, less an opportunity cost of 65 percent, are estimated to have an annual impact of $0.080 million with a cumulative present value of $0.541 million.

- Canada Border Service Agency (CBSA) - The CBSA employs 19 people at the Port of Yarmouth providing customs services for bonded warehouses, the port and the airports at both Yarmouth and Digby. Sixteen of these positions are seasonal inspectors. It has been assumed that most of the seasonal positions would no longer be necessary if there was no ferry service. The estimated impact on the local economy is $0.16 million annually, net of opportunity cost.

Figure 5-14: Projected Net Economic Impacts for Option 1(a): Yarmouth-Maine High Speed Ferry ($ millions)

Economic Impact	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Commercial Traffic	0.198	0.198	0.198	0.198	0.198	0.198	0.198	0.198	0.198	0.198	1.338
Tourism Impacts	4.969	5.068	5.119	5.170	5.222	5.274	5.327	5.380	5.434	5.488	35.164
Passenger Traffic	3.136	3.199	3.231	3.263	3.296	3.329	3.362	3.396	3.429	3.464	22.192
Accident Costs	0.500	0.510	0.515	0.520	0.525	0.531	0.536	0.541	0.547	0.552	3.538
GHG Emissions	-0.040	-0.041	-0.041	-0.042	-0.042	-0.042	-0.043	-0.043	-0.044	-0.044	-0.283
Ferry Service Employment	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480	3.244
Other Service Expenditures	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	3.643
Tourism Information Centre	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.541
CBSA Services	0.158	0.158	0.158	0.158	0.158	0.158	0.158	0.158	0.158	0.158	1.065
Total Net Economic Impacts	**10.020**	**10.191**	**10.278**	**10.366**	**10.456**	**10.546**	**10.636**	**10.728**	**10.821**	**10.915**	**70.442**

5.4.1.8 Summary

Projected expenses associated with the continuation of the Yarmouth-Maine high speed ferry service are estimated to have a present value of $138.7 million in $2010 over the 2010 to 2019 period. Operating revenues over the same period are estimated to have a present value of $85.7 million. The difference between expenses and revenues therefore has a present value of $53.0 million. In undiscounted terms, annual deficits are projected to range from $6.8 million to $8.8 million over the period in question.

The present value of benefits from continued operations of the Yarmouth-Maine ferry service are estimated to be $70.4 million consisting primarily of travel/time impacts ($22.2 million) and benefits to Nova Scotia tourism ($35.1 million).

With the above parameters, a benefit-cost ratio of approximately 1.3 results - an expenditure of $53.0 million is required to achieve benefits of $70.4 million.

5.4.2 Option 1(b): Used Ropax (Dig-SJ) + Seasonal High Speed (Yar-BH & Port)

Digby-Saint John Ropax (used)

For this option, the same operating parameters as Option 1(a) exist *with the exception of the 2010 operating year*. No service will be provided out of Yarmouth which will cause approximately 25 percent of the existing Yarmouth traffic to switch to the Digby-Saint John crossing. While no detailed capacity assessment has been done, the fuel cost associated with 90 extra crossings in the peak summer period has been added. The incremental cost is essentially equivalent to the incremental revenue earned.

5.4.2.1 Traffic & Revenue Forecast

Traffic shifting from Yarmouth would increase revenue by approximately $1.2 million in 2010.

5.4.2.2 Capital & Operating Costs

Operating costs would increase by approximately $1.2 million per year to provide increased peak season crossings in 2010.

5.4.2.3 Net Economic Impacts

Some incremental net economic impacts would be created in 2010 from the addition of the shifted Yarmouth traffic. Compared to a drive around situation, it is estimated that $3.2 million in incremental passenger benefits will result. This will increase the present value of net economic impacts from $140.9 million to $144.1 million for the Digby-Saint John ropax.

5.4.2.4 Summary

The deficit noted for Option 1(a) will be very similar to this option.

Yarmouth-Bar Harbor Seasonal High Speed Ferry

This option represents a return to the service configuration in existence prior to 2006 when Bay Ferries ran a seasonal high speed service between Yarmouth and Bar Harbor only. Beginning in 2006, the company reduced its service to Bar Harbor and added Portland as a port of call.

Because of the shorter distance between Yarmouth and Bar Harbor (compared to Portland) the high speed vessel was able to offer two round trips per day in the peak season. In 2002 the Yarmouth-Bar Harbor service peaked at 165,000 passengers, but an average of over 150,000 passengers was carried from 1998 to 2005 - the period when a high speed vessel was providing this service.

5.4.2.5 Traffic & Revenue Forecast

The multitude of factors that have affected tourism activity in Atlantic Canada have been described in an earlier Working Paper and previous studies. Travel from the United States to Canada in general has declined significantly and there has been little abatement of the causal factors. We should therefore not presume that the traffic levels in existence on this crossing prior to 2006 will return. However, the confusion in the marketplace would be removed and the

opportunity to offer more day cruises from Bar Harbor would return. So would the original value proposition for a high speed ferry across the Bay of Fundy: it saves time and driving miles and has considerable market appeal as the fastest vessel operating in North America. It is also more suitable for the shorter crossing to Bar Harbor.

For the purposes of evaluating this option, the consulting team has chosen a passenger and passenger vehicle forecast profile that is the same as the existing Yarmouth-Bar Harbor and Portland in aggregate. Modest rates of growth (2% in 2011 and 1% per year thereafter) have been assumed.

It has further been assumed that this service would take a very limited number of motorcoach units.

Figure 5-15 contains the estimated traffic and revenue volumes for the 2010 to 2019 period.

One of the principal features of this option is the potential traffic and revenue that could be available should a return to the pre-2006 demand situation reoccur. Traffic and revenue increments of 50 percent or more above those contemplated in Figure 5-8 are conceivable should tourism markets improve.

Figure 5-15: Forecast Traffic and Revenue for Option 1(b): Yarmouth-Bar Harbor Seasonal High Speed Ferry

Year	PAX	PAX Rev. $mil	Passenger Related Vehicles	PRV Rev. $mil	Commercial Related Vehicles	CRV Rev. $mil	Ancillary Rev. $mil	Total Revenue $mil.
2010	-	-	-	-	-	-	-	-
2011	80,550	4.028	26,800	4.020	150	.120	1.02	9.188
2012	81,350	4.068	27,100	4.065	150	.120	1.03	9.283
2013	82,150	4.108	27,350	4.106	150	.120	1.04	9.374
2014	83,000	4.150	27,600	4.147	150	.120	1.05	9.467
2015	83,800	4.190	27,900	4.188	150	.120	1.06	9.560
2016	84,650	4.233	28,150	4.230	150	.120	1.07	9.655
2017	85,500	4.275	28,450	4.272	150	.120	1.08	9.750
2018	86,350	4.318	28,750	4.315	150	.120	1.09	9.846
2019	87,200	4.361	29,050	4.358	150	.120	1.10	9.944

For sensitivity purposes, should traffic vary by a factor of 10 percent annual deficits would change by approximately $1.0 million per annum.

5.4.2.6 Capital & Operating Costs

Figure 5-16 contains the consulting team's estimate of operating expenses for the seasonal Yarmouth-Bar Harbor high speed ferry service. Costs are based on a twice daily schedule from late June to early September and once per day for the remaining portions of the late May to mid October operating season.

Excluded from the cost profile are start up costs that would be required to initiate a new service in 2011. Recruitment, training, marketing, advertising and vessel deployment/repositioning costs would be experienced by a new service.

The present value of operating costs for the 2011 to 2019 period is estimated at $124.9 million while the present value of operating revenues is $54.7 million. The present value of the difference between operating expenses and revenues is therefore $70.2 million. In undiscounted terms, annual deficits are in the $10.9 to $12.1 million range.

Should fuel costs vary by a factor of 20 percent annual deficits would change by approximately $0.8 million annually.

**Figure 5-16: Projected Expenses for Option 1(b):
Yarmouth-Bar Harbor Seasonal High Speed Ferry ($ millions)**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Vessel											
Capital / Interest		6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	38.551
Fuel		3.931	3.931	3.931	3.931	3.931	3.931	3.931	3.931	3.931	22.639
Crew		1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	7.567
Maintenance		1.500	1.500	1.600	1.700	1.800	1.900	2.000	2.100	2.200	10.096
Lay-Up Costs		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	5.759
Other		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	5.759
Subtotal		*15.439*	*15.439*	*15.539*	*15.639*	*15.739*	*15.839*	*15.939*	*16.039*	*16.139*	90.371
Terminal & Admin											
Labour		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	5.759
Maintenance	2.480	0.631	1.170	1.748	1.475	2.000	2.000	2.000	2.000	2.000	11.520
Administration		2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	14.398
Other		0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	2.880
Subtotal	*2.480*	*4.631*	*5.170*	*5.748*	*5.475*	*6.000*	*6.000*	*6.000*	*6.000*	*6.000*	34.556
Total Expenses	***2.480***	***20.070***	***20.609***	***21.287***	***21.114***	***21.739***	***21.839***	***21.939***	***22.039***	***22.139***	***124.926***
Revenue		***9.188***	***9.283***	***9.374***	***9.467***	***9.560***	***9.655***	***9.750***	***9.846***	***9.943***	***54.733***
Expenses - Revenue	***2.480***	***10.882***	***11.326***	***11.913***	***11.647***	***12.179***	***12.184***	***12.189***	***12.193***	***12.196***	***70.194***

5.4.2.7 Net Economic Impacts

Should the traffic levels of 80,550 passengers and 26,800 vehicles materialize, there would be substantial positive impacts experienced in the Yarmouth area tourism sector. However, without knowing the length of stay and expenditure characteristics of this traffic element, it is difficult to precisely delineate the impact that might be produced.

Based on high level assumptions, the consulting team estimates that net economic impacts from this assumption will have a present value ranging from $45 million to $70 million.

5.4.2.8 Summary

A return to a seasonal Yarmouth-Bar Harbor high speed ferry service produces annual subsidy estimates that are substantially higher than the previous Yarmouth-Bar Harbor and Portland crossing. Given the present value of net costs of approximately $70.2 million, a benefit-cost ratio of 0.6 to 1.0 results.

As has been noted however, this option has a very real possibility of higher traffic volumes than the conservative estimates chosen. For instance, a return to 120,000 annual passengers, which is 20 percent lower than the 2001 to 2006 average, would lower the deficit by $4.0 million per year.

5.4.3 Option 1(d): Used Ropax (Dig-SJ) + Seasonal Cruise Ferry (Yar-Port)

Saint John-Digby Ropax (used)

5.4.3.1 Traffic & Revenue Forecast

Because of the lack of a Yarmouth service in 2010, incremental revenue of $1.2 million would be generated for the Digby-Saint John service.

If a Yarmouth-Portland cruise ferry commenced service in 2011 the incremental revenue of 2010 would disappear as would some of the truck traffic currently taking the Digby-Saint John service. It is assumed that approximately 1,500 trucking units now utilizing Digby-Saint John would divert to the seasonal cruise ferry, thus reducing revenue on Digby-Saint John by an estimated $0.525 million.

Figure 5-17: Forecast Traffic and Revenue for Option 1(d): Digby-Saint John Used Ropax

Year	PAX	PAX Rev. $mil	Passenger Related Vehicles	PRV Rev. $mil	Commercial Related Vehicles	CRV Rev. $mil	Ancillary Rev. $mil	Total Revenue $mil.
2010	131,200	$3.279	39,480	$3.356	10,400	$3.640	$.779	$11.053
2011	118,200	$2.955	33,800	$2.877	10,500	$3.675	$.702	$10.209
2012	119,400	$2.984	34,200	$2.906	12,000	$4.200	$.709	$10.799
2013	120,600	$3.014	34,500	$2.935	12,100	$4.235	$.716	$10.900
2014	121,800	$3.044	34,900	$2.964	12,300	$4.305	$.723	$11.037
2015	123,000	$3.075	35,200	$2.994	12,400	$4.340	$.731	$11.139
2016	124,200	$3.106	35,600	$3.024	12,600	$4.410	$.738	$11.277
2017	125,500	$3.137	35,900	$3.054	12,700	$4.445	$.745	$11.381
2018	126,700	$3.168	36,300	$3.084	12,800	$4.480	$.753	$11.485
2019	128,000	$3.200	36,700	$3.115	13,000	$4.550	$.760	$11.625

5.4.3.2 Capital & Operating Costs

Operating costs would increase in 2010 by approximately $1.2 million due to fuel costs related to additional trips. Costs from 2011 forward will be identical to those noted in Section 5.4.1.2.

5.4.3.3 Net Economic Impacts

Passenger related impacts would increase for the 2010 operating year by approximately $3.2 million. In 2011, and beyond, commercial trucking impacts would decline by approximately $0.9 million per year. The present value of benefits for the Digby-Saint John service in this option is estimated at $135 to $140 million.

5.4.3.4 Summary

The present value of the deficit for this option is estimated at $91.0 million compared to net economic impacts of $135 to $140 million. A benefit-cost ratio of 1.5 results.

Yarmouth-Portland Seasonal Cruise Ferry

Prince of Fundy Cruises and its predecessor companies operated the *Scotia Prince* between Yarmouth and Portland seasonally from 1970 to 2005. That cruise ferry business at one time reportedly carried in the range of 170,000 passengers to and from Nova Scotia. The length of the crossing approached 11 hours, and Prince of Fundy reserved one day per week for maintenance activities.

5.4.3.5 Traffic & Revenue Forecast

It has been assumed that at least five round trips per week could be made on this crossing and that, with appropriate marketing, the same level of traffic handled on, and forecast, for the 2009 Yarmouth-Maine services could be achieved.

Commercial traffic can also be handled and it has further been assumed that approximately 1,500 units would be carried.

A cruise ferry environment provides more amenities and a higher level of service. For an upscale product it has been assumed that rates in the current tariff can be increased by 15 percent, although it would be competing with cruises operating from New York and Boston to ports in the Maritimes. The longer crossing would also provide an opportunity to elevate casino, bar, and other on board services, and thus increase onboard revenues. As a consequence, ancillary revenue totals have been boosted to $5.0 million per year.

Should traffic vary by 10 percent, revenue would vary by approximately $2.0 million per year.

Figure 5-18: Forecast Traffic and Revenue for Option 1(d): Yarmouth-Portland Seasonal Cruise Ferry

Year	Pax	Pax Rev. $mil	Passenger Related Vehicles	PRV Rev. $mil	Commercial Related Vehicles	CRV Rev. $mil	Ancillary Rev. $mil	Total Revenue $mil.
2010	-	-	-	-	-	-	-	-
2011	80,600	$9.263	26,800	$6.298	1,500	1.500	$5.000	$22.061
2012	81,400	$9.356	27,100	$6.361	1,500	1.500	$5.050	$22.267
2013	82,200	$9.449	27,300	$6.425	1,500	1.500	$5.101	$22.475
2014	83,000	$9.544	27,600	$6.489	1,500	1.500	$5.152	$22.684
2015	83,800	$9.639	27,900	$6.554	1,500	1.500	$5.203	$22.896
2016	84,700	$9.736	28,200	$6.619	1,500	1.500	$5.255	$23.110
2017	85,500	$9.833	28,400	$6.685	1,500	1.500	$5.308	$23.326
2018	86,400	$9.931	28,700	$6.752	1,500	1.500	$5.361	$23.544
2019	87,200	$10.031	29,000	$6.820	1,500	1.500	$5.414	$23.765

5.4.3.6 Capital & Operating Costs

Figure 5-19 contains the consulting team's expenditure estimates for the provision of the seasonal cruise ferry service between Yarmouth and Portland.

It has been assumed that the used cruise ferry would cost $50 million and that it would be operated with a Canadian crew. However, Prince of Fundy Cruises provided this service profitably with Scandinavian officers and low paid crew of differing nationalities. Fuel costs have being increased to correspond with higher operating speeds which would be necessary to achieve a 24 hour schedule. As well, additional marketing expenses of approximately $1.0 million have been inserted into the administration category. This additional marketing expenditure would be required to attract cruise passengers in the larger metropolitan centres in the north eastern United States. It could also be augmented, as in the past, with joint advertising/promotion with the Province of Nova Scotia and the Atlantic Canada Tourism Partnership (ACTP).

Given these assumptions, the present value of total operating costs is $161.7 million over the 2011 to 2019 period compared to a value of $131.1 million for operating revenues. The present value of the difference between costs and revenues is approximately $30.6 million. Undiscounted deficits necessary to equate costs and revenues are estimated at $4.6 to $5.6 million over the 2011 to 2019 period. A reduction in these costs would result from the employment of a foreign crew.

Should fuel costs vary by 10 percent expenses would vary by approximately $0.5 million per year.

No start-up costs have been added to the cost profile, but they would be substantial, including potential ship modifications marketing, advertising, the establishment of a reservations centre, hiring and training crew and terminal staff, etc.

Figure 5-19: Projected Expenses for Option 1(d): Yarmouth-Portland Seasonal Cruise Ferry ($ millions)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Vessel											
Capital / Interest		6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	38.551
Fuel		4.608	4.608	4.608	4.608	4.608	4.608	4.608	4.608	4.608	26.538
Crew		5.400	5.400	5.400	5.400	5.400	5.400	5.400	5.400	5.400	31.099
Maintenance		3.650	3.650	3.650	3.750	3.850	3.950	4.050	4.150	4.150	22.033
Lay-Up Costs		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	5.759
Other		0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	2.880
Subtotal		*21.852*	*21.852*	*21.852*	*21.952*	*22.052*	*22.152*	*22.252*	*22.352*	*22.352*	126.859
Terminal & Admin											
Labour		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	5.759
Maintenance	1.665	0.315	0.315	0.418	1.335	1.000	1.000	1.000	1.000	1.000	6.027
Administration		3.500	3.500	3.500	3.500	3.500	3.500	3.500	3.500	3.500	20.157
Other		0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	2.880
Subtotal	*1.665*	*5.315*	*5.315*	*5.418*	*6.335*	*6.000*	*6.000*	*6.000*	*6.000*	*6.000*	34.822
Total Expenses	***1.665***	***27.167***	***27.167***	***27.270***	***28.287***	***28.052***	***28.152***	***28.252***	***28.352***	***28.352***	***161.680***
Revenue		***22.061***	***22.267***	***22.474***	***22.684***	***22.896***	***23.110***	***23.326***	***23.544***	***23.764***	***131.130***
Expenses - Revenue	***1.665***	***5.106***	***4.900***	***4.796***	***5.603***	***5.156***	***5.042***	***4.926***	***4.808***	***4.588***	***30.551***

5.4.3.7 Net Economic Impacts

Net economic impacts for the cruise ferry are considerably lower than for high speed options between these two locations. Tourism benefits are estimated at approximately $4.5 million per annum. Passenger travel and time benefits are actually negative because of slower vessel speeds and higher ferry rates. A negative impact of $0.562 million per year is estimated. In aggregate, net economic benefits are estimated to be approximately $4.0 million per year. The present value for the 2011 to 2019 time frame is therefore in the $20.0 to $25.0 million dollar range.

5.4.3.8 Summary

Given traffic, revenue, and operating cost assumptions, (including employment of Canadian crew), annual deficits for this service configuration are projected to be in the $5.0 million per year range. The present value of operating deficits is $30.6 million, which represents a benefit-cost ratio of 0.7 to 0.8.

5.4.4 Option 1(f): New Ropax (Dig-SJ) + Seasonal High Speed (Yar-BH)

Saint John-Digby Ropax (new)

For purposes of benefit-cost analysis it is assumed that a new ropax for the Digby-Saint John crossing could be in place for the 2014 operating season, at an estimated purchase price of $100 million. It is also assumed that the *Princess of Acadia* will cease operating at the end of 2010, and that a used ropax charter vessel would be acquired to cover the period from 2011 to 2013. It is assumed that this charter would commence in July 2010 at a cost of $1.0 million per month and that $10 million in modifications would be required prior to entering service.

The placement of a new ropax on the Digby-Saint John service could stimulate demand by offering an improved on board experience.

5.4.4.1 Traffic & Revenue Forecast

With the introduction of a used ropax in 2011, it is predicted that a five percent passenger traffic stimulus will result. This will be followed by another five percent stimulus in 2014 when the new vessel is introduced. It should also be noted that 2010 traffic levels reflect some carryover of Yarmouth – Maine traffic, as this service is assumed to be suspended until 2011.

Traffic growth rates for the remainder of the period are identical to those assumed for the status quo situation.

Figure 5-20: Forecast Traffic and Revenue for Option 1(f): New Digby-Saint John Ropax

Year	PAX	PAX Rev. $mil	Passenger Related Vehicles	PRV Rev. $mil	Commercial Related Vehicles	CRV Rev. $mil	Ancillary Rev. $mil	Total Revenue $mil
2010	131,100	$3.279	38,500	$3.271	10,400	$3.640	$.779	$10.968
2011	118,200	$2.955	33,900	$2.877	12,000	$4.200	$.702	$10.734
2012	119,400	$2.984	34,200	$2.906	13,500	$4.725	$.709	$11.324
2013	120,600	$3.014	34,500	$2.935	13,600	$4.760	$.716	$11.425
2014	127,900	$3.198	36,600	$3.114	13,800	$4.830	$.760	$11.902
2015	129,200	$3.230	37,000	$3.145	13,900	$4.865	$.767	$12.007
2016	130,500	$3.262	37,400	$3.176	14,100	$4.935	$.775	$12.149
2017	131,800	$3.295	37,700	$3.208	14,200	$4.970	$.783	$12.256
2018	133,100	$3.328	38,100	$3.240	14,300	$5.005	$.791	$12.364
2019	134,500	$3.361	38,500	$3.273	14,500	$5.075	$.799	$12.507

5.4.4.2 Capital & Operating Costs

It is assumed that the existing *Princess of Acadia* service would be continued in 2010 and replaced with a used ropax charter for the 2011 to 2013 period. With assumed capital costs of $100 million, capital and interest payments of $13.4 million would commence in 2014. Some small efficiencies would be achieved in crew costs and vessel maintenance for the first two years. Maintenance expenditures would increase gradually over the study period to reflect vessel aging.

The present value of total operating expenditures is $195.1 million over the 2010 to 2019 operating period while the present value of operating revenues is $78.5 million. The present value of the difference between expenses and revenues is $116.7 million.

Figure 5-21: Projected Expenses for Option 1(f): New Digby-Saint John Ropax ($ millions)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Vessel											
Capital / Interest	16.000	12.000	12.000	12.000	13.388	13.388	13.388	13.388	13.388	13.388	89.650
Fuel	3.500	3.500	6.653	6.653	6.653	6.653	6.653	6.653	6.653	6.653	38.948
Crew	2.829	2.829	2.700	2.700	2.700	2.700	2.700	2.700	2.700	2.700	18.496
Maintenance	2.500	2.000	2.000	2.250	1.000	1.000	1.500	1.500	2.000	2.000	12.363
Lay-Up Costs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*25.329*	*20.829*	*23.853*	*24.103*	*24.241*	*24.241*	*24.741*	*24.741*	*25.241*	*25.241*	162.837
Terminal & Admin											
Labour	1.300	1.300	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	7.332
Maintenance	1.092	0.708	1.378	0.501	4.431	2.000	2.000	2.000	2.000	2.000	11.456
Administration	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	10.139
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*4.392*	*4.008*	*4.378*	*3.501*	*7.431*	*5.000*	*5.000*	*5.000*	*5.000*	*5.000*	32.305
Total Expenses	***29.721***	***24.837***	***28.231***	***27.604***	***31.672***	***29.241***	***29.741***	***29.741***	***30.241***	***30.241***	***195.142***
Revenue	***10.968***	***10.734***	***11.324***	***11.425***	***11.901***	***12.007***	***12.149***	***12.256***	***12.364***	***12.507***	***78.472***
Expenses - Revenue	***18.753***	***14.103***	***16.907***	***16.179***	***19.771***	***17.234***	***17.592***	***17.485***	***17.877***	***17.734***	***116.670***

5.4.4.3 Net Economic Impacts

It is estimated that the present value of net economic impacts for this option will be in the range of $150 to $160 million. Given the present value of deficits of approximately $116.7 million, the benefit-cost ratio is estimated to be 1.3.

5.4.4.4 Summary

A new ferry on this service would provide a significant freshening up of the service and stimulate demand from being faster and better appointed. Conservative estimates of the total increased demand from its introduction are five percent.

Because of the new vessel however, and its estimated $100 million cost, annual deficits would range from $17.5 million to $19.8 million per year during the 2014 to 2019 period.

The need to charter an interim vessel requiring substantial modifications, prior to acquiring a new vessel results in higher short term costs and a lower benefit-cost ratio than simply acquiring a used vessel on a permanent basis, or, indeed, acquiring a new vessel in the very short term.

Yarmouth-Bar Harbor Seasonal High Speed Ferry

Revenue, costs and net economic impacts for this option are the same as described in Section 5.4.2.

5.4.5 Option 1(h): New Ropax (Dig-SJ) + Seasonal Cruise Ferry (Yar-Port)

Digby-Saint John Ropax (new)

Revenue, expenses and net economic impacts are the same as those described in Section 5.4.4.

5.4.6 Yarmouth-Portland Cruise Ferry

Revenue, expenses and net economic impacts are the same as those described in Section 5.4.3.

5.4.7 Option 3(a): Used Ropax (Dig-SJ) + No Yarmouth Service

The essential difference between this option and Option 1 (b) service between Digby and Saint John is that some diverted traffic from Yarmouth would utilize the Digby-Saint John crossing for the duration of the study period.

Digby-Saint John Ropax (used)

5.4.7.1 Traffic & Revenue Forecast

Figure 5-22 contains estimates of traffic levels and associated revenues for a Digby-Saint John ropax, assuming there is no ferry service from Yarmouth effective for the 2011 operating season.

Since the Yarmouth service would essentially only be carrying passenger-related traffic, no adjustments are required to commercial traffic levels. Longer term rates of traffic increase contemplated for the Digby-Saint John service are also applied to the additional traffic from Yarmouth. Ancillary revenue has also been adjusted in proportion to the new traffic.

Should traffic change by 10 percent, revenues would vary by approximately $1.3 million per annum.

Figure 5-22: Forecast Traffic and Revenue for Option 3(a): Used Digby-Saint John Ropax (w/no Yarmouth Service)

Year	PAX	PAX Rev. $mil	Passenger Related Vehicles	PRV Rev. $mil	Commercial Related Vehicles	CRV Rev. $mil	Ancillary Rev. $mil	Total Revenue $mil
2010	131,100	$3.279	38,500	$3.356	10,400	$3.640	$.779	$11.053
2011	139,100	$3.478	41,900	$3.561	12,000	$4.200	$.702	$11.941
2012	140,500	$3.513	42,300	$3.596	13,500	$4.725	$.709	$12.544
2013	141,900	$3.548	42,700	$3.632	13,600	$4.760	$.716	$12.657
2014	143,400	$3.584	43,200	$3.668	13,800	$4.830	$.723	$12.806
2015	144,800	$3.620	43,600	$3.705	13,900	$4.865	$.731	$12.920
2016	146,200	$3.656	44,000	$3.742	14,100	$4.935	$.738	$13.071
2017	147,700	$3.692	44,500	$3.780	14,200	$4.970	$.745	$13.187
2018	149,200	$3.729	44,900	$3.817	14,300	$5.005	$.753	$13.305
2019	150,700	$3.767	45,400	$3.856	14,500	$5.075	$.760	$13.457

5.4.7.2 Capital & Operating Costs

Figure 5-23 contains the estimated cost profile for the Digby-Saint John ropax with no Yarmouth service from 2010 forward. Fuel associated with an additional 90 round trips has been added to the cost base compared to the 2009 status quo Digby-Saint John option (Option 1(a).

The present value of total operating expenses for this option is $173.0 million and the present value of the revenue stream amounts to $84.7 million. The present value of the difference between expenses and revenues is $88.3 million.

Should fuel expenses change by 10 percent, expenses would change by approximately $0.7million from 2012 forward.

**Figure 5-23: Projected Expenses for Option 3(a):
Used Digby-Saint John Ropax (w/no Yarmouth Service)**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Vessel											
Capital / Interest	16.000	12.000	6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	59.375
Fuel	4.130	6.542	6.542	6.542	6.542	6.542	6.542	6.542	6.542	6.542	41.806
Crew	2.829	2.829	2.829	2.829	2.829	2.829	2.829	2.829	2.829	2.829	19.121
Maintenance	2.500	2.000	2.000	2.000	2.250	2.250	2.500	2.500	2.750	2.750	15.551
Lay-Up Costs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*25.959*	*23.871*	*18.565*	*18.565*	*18.815*	*18.815*	*19.065*	*19.065*	*19.315*	*19.315*	139.232
Terminal & Admin											
Labour	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	8.787
Maintenance	1.092	0.708	1.378	0.501	4.431	2.000	2.000	2.000	2.000	2.000	11.456
Administration	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	10.139
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*4.392*	*4.008*	*4.678*	*3.801*	*7.731*	*5.300*	*5.300*	*5.300*	*5.300*	*5.300*	33.760
Total Expenses	***30.351***	***27.879***	***23.243***	***22.366***	***26.546***	***24.115***	***24.365***	***24.365***	***24.615***	***24.615***	***172.992***
Revenue	***11.053***	***11.941***	***12.543***	***12.656***	***12.807***	***12.920***	***13.071***	***13.187***	***13.304***	***13.547***	***84.650***
Expenses - Revenue	***19.298***	***15.938***	***10.700***	***9.710***	***13.739***	***11.195***	***11.294***	***11.178***	***11.311***	***11.068***	***88.342***

5.4.7.3 Net Economic Impacts

Net economic impacts for Option 3(a) are estimated to be between $155 and $165 million.

5.4.7.4 Summary

The present value of projected operating costs for Option 3(a) is $173.0 million and the present value of operating revenues is $84.7 million with the difference between costs and revenues amounting to a present value of $88.3 million over the 2010 to 2020 operating period.

In undiscounted terms, annual deficits are projected to range from $9.7 to $15.9 million once the used ropax is introduced in 2011.

The benefit-cost ratio is estimated to be 1.8.

5.4.8 Option 3(b): New Ropax (Dig-SJ) + No Yarmouth Service

Digby-Saint John Ropax (new)

5.4.8.1 Traffic & Revenue Forecast

An incremental traffic increase of an additional 5 percent in 2014, which would be sustained thereafter, is anticipated to occur with the introduction of the new ropax. Traffic and revenue streams for the duration of the 2010 to 2019 study period are contained in Figure 5-24 below.

Figure 5-24: Traffic and Revenue Forecast for Option 3(b): New Digby-Saint John Ropax (w/no Yarmouth Service)

Year	PAX	PAX Rev. $mil	Passenger Related Vehicles	PRV Rev. $mil	Commercial Related Vehicles	CRV Rev. $mil	Ancillary Rev. $mil	Total Revenue $mil
2010	131,100	$3.279	38,500	$3.356	10,400	$3.640	$.779	$11.053
2011	139,100	$3.478	41,900	$3.561	12,000	$4.200	$.702	$11.941
2012	140,500	$3.513	42,300	$3.596	13,500	$4.725	$.709	$12.544
2013	141,900	$3.548	42,700	$3.632	13,600	$4.760	$.716	$12.657
2014	150,600	$3.765	45,300	$3.854	13,800	$4.830	$.723	$13.172
2015	152,100	$3.803	45,800	$3.892	13,900	$4.865	$.731	$13.290
2016	153,600	$3.841	46,200	$3.931	14,100	$4.935	$.738	$13.445
2017	155,200	$3.879	46,700	$3.970	14,200	$4.970	$.745	$13.565
2018	156,700	$3.918	47,200	$4.010	14,300	$5.005	$.753	$13.686
2019	158,300	$3.957	47,600	$4.050	14,500	$5.075	$.760	$13.842

Should traffic vary by 10 percent, revenues would vary by approximately $1.3 million per annum

5.4.8.2 Capital & Operating Costs

Capital and operating costs for this option are noted in Figure 5-25. The new vessel with a capital cost of approximately $100 million would have annual capital/interest charges of $13.4 million commencing in 2014. Because the vessel would be new, however, considerable savings are anticipated in annual maintenance costs. For the first two years of service maintenance costs of $1.0 million per year have been assumed. These costs increase gradually over the study period to reach $1.75 million in 2019.

The present value of operating and capital costs over the study period is $197.8 million. The present value of the revenue stream is $85.8 million. The present value of the difference between costs and revenue is $112.0 million. Undiscounted annual deficits range from $16.1 to $18.4 million in the period from 2014 to 2019. Rising subsidies are primarily caused by rising maintenance expenses.

Should fuel costs vary by 10 percent, annual expenditures will vary by approximately $0.7 million.

5.4.8.3 Net Economic Impacts

Net economic impacts are estimated to range from $160 to $170 million for this option.

5.4.8.4 Summary

The present value of deficits is estimated to be $112.0 million. Using the net economic impact numbers above, the benefit-cost ratio would range from 1.4 to 1.5.

**Figure 5-25: Projected Expenses for Option 3(b):
New Digby-Saint John Ropax (w/no Yarmouth Service)**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Vessel											
Capital / Interest	16.000	12.000	12.000	12.000	13.388	13.388	13.388	13.388	13.388	13.388	89.650
Fuel	4.130	6.542	6.542	6.542	6.542	6.542	6.542	6.542	6.542	6.542	41.806
Crew	2.829	2.829	2.829	2.829	2.700	2.700	2.700	2.700	2.700	2.700	18.699
Maintenance	2.500	2.000	2.000	2.000	1.000	1.000	1.500	1.500	1.750	1.750	11.953
Lay-Up Costs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*25.959*	*23.871*	*23.871*	*23.871*	*24.130*	*24.130*	*24.630*	*24.630*	*24.880*	*24.880*	165.487
Terminal & Admin											
Labour	1.300	1.300	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	7.332
Maintenance	1.092	0.708	1.378	0.501	4.431	2.000	2.000	2.000	2.000	2.000	11.456
Administration	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	10.139
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*4.392*	*4.008*	*4.378*	*3.501*	*7.431*	*5.000*	*5.000*	*5.000*	*5.000*	*5.000*	32.305
Total Expenses	***30.351***	***27.879***	***28.249***	***27.372***	***31.561***	***29.130***	***29.630***	***29.630***	***29.880***	***29.880***	***197.792***
Revenue	***11.053***	***11.941***	***12.544***	***12.657***	***13.171***	***13.290***	***13.445***	***13.565***	***13.686***	***13.842***	***85.838***
Expenses - Revenue	***19.298***	***15.938***	***15.705***	***14.715***	***18.390***	***15.840***	***16.185***	***16.065***	***16.194***	***16.038***	***111.954***

5.5 Summary of Option Impacts

Figure 5-26 provides a summary of estimated impacts for each of the options analyzed in this section. Note that the impacts of having no service in either Digby or Yarmouth can be estimated by eliminating the impacts provided by Option 1(a). In other words, no service would result in a total net economic impact of -$211.3 million (PV in $2010). Contributions of approximately $144.0 million would be required to achieve the net economic impacts.

In other words, over ten years SWNS would lose $141 million in benefits from three principal categories: commercial trucking ($54.5 million), the tourism industry ($38.2 million) and reduced passenger vehicle operating costs ($30.7 million). For the same analysis applied to what was the status quo at the beginning of the project, i.e. Yarmouth-Maine high speed service in place, over ten years SWNS would lose $70.4 million in benefits, consisting primarily of travel/time impacts ($22.2 million) and benefits to Nova Scotia tourism ($35.1 million). Operating deficits of $91 million would be avoided in the case of Digby-Saint John and $53 million in the case of Yarmouth-Maine.

Figure 5-26: Summary of Option Impacts

Option	Net Costs (PV - $2010 millions)	Net Benefits (PV - $2010 millions)	Benefit/Cost Ratio
Opt 1(a) – Dig-SJ Ropax (used)	91.0	$141	1.5
Opt 1(a) – Yar-Me High Speed	$53.0	$70	1.3
Opt 1(b) – Dig-SJ Ropax (used)	$91.0	$144	1.6
Opt 1(b) – Yar-BH High Speed	$70.2	$45 to $70	0.6 to 1.0
Opt 1(d) – Dig-SJ Ropax (used)	$91.0	$135 to $140	1.5
Opt 1(d) – Yar-Port Cruise	$30.6	$20 to $25	0.7 to 0.8
Opt 1(f) – Dig-SJ Ropax (new)	$116.7	$150 to $160	1.3 to 1.4
Opt 1(f) – Yar-BH High Speed	$70.2	$45 to $70	0.6 to 1.0
Opt 1(h) – Dig-SJ Ropax (new)	$116.7	$150 to $160	1.3 to 1.4
Opt 1(h) – Yar-Port Cruise	$30.6	$20 to $25	0.7 to 0.8
Opt 3(a) – Dig-SJ Ropax (used)	$88.3	$155 to $165	1.8 to 1.9
Opt 3(a) – No Service Yar	-	-	-
Opt 3(b) – Dig-SJ Ropax (new)	$112.0	$160 to $170	1.4 to 1.5
Opt 3(b) – No Service Yar	-	-	-

6 Road Improvement Options

Based on feedback obtained during the extensive stakeholder consultation process and the results of an internal strategy session held by the study team, the four areas of greatest concern associated with the existing road network are:

1. Highway 101 between Digby and Weymouth;
2. Highway 103 between Broad River and Sable River;
3. Trunk 8 between Annapolis Royal and Liverpool; and
4. The connection of Highway 101/103 in Yarmouth.

Each of these issues was described in Section 4.3, with the exception of Trunk 8 which was first identified during the stakeholder consultations. Further investigation revealed poor pavement condition to be the primary concern on that roadway. NSTIR plans to undertake three repaving projects within this corridor over the next three years which should address the issue. Although routine maintenance and rehabilitation improvements are outside the scope of this study, it should be noted that funding for these types of improvements is a key issue for the provincial government.

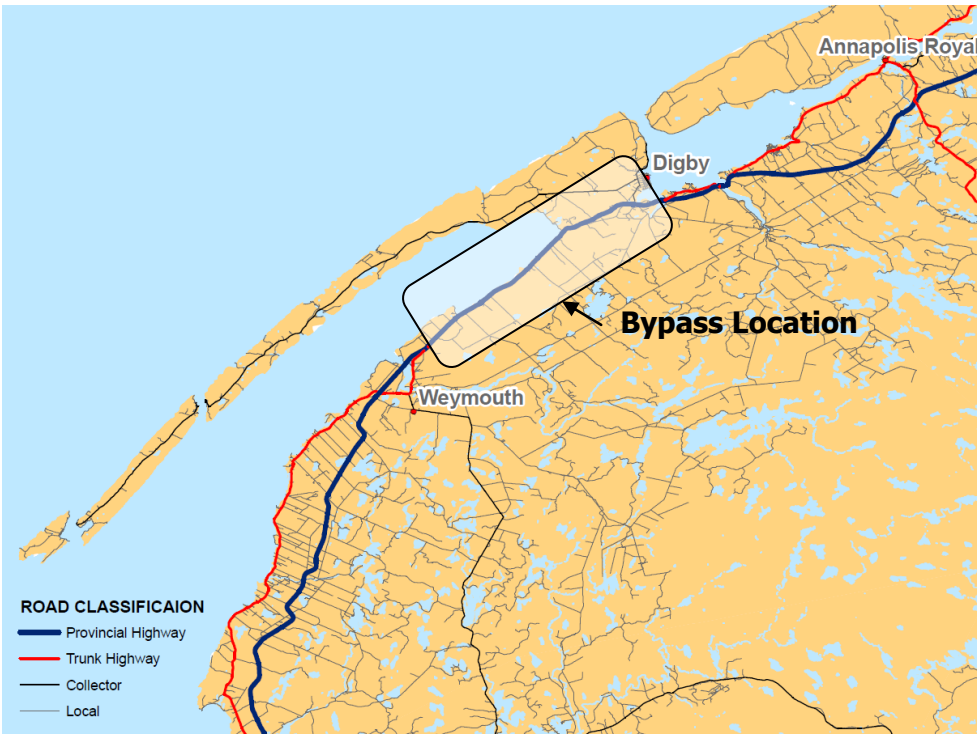
This chapter provides descriptions of road improvement options to address the three remaining areas identified above. Each description contains a summary of associated positive and negative impacts as well as a high level cost estimate.

6.1 Digby-Weymouth Bypass (Highway 101)

6.1.1 Description

This option would involve constructing a new 26 km roadway alignment to bypass the existing shared section of Highway 101/Trunk 1 between Digby and Weymouth (see Figure 6-1). This is the last section of Trunk 1 remaining to be bypassed by Highway 101. The new alignment would be a 2-lane highway with full access control and a posted speed limit of 100 km/h.

Figure 6-1: Location of Proposed Digby-Weymouth Bypass



6.1.2 Positive Impacts

It is anticipated that the single greatest benefit resulting from the new bypass would be improved highway safety. As shown in Figure 6-2, the existing section between Digby and Weymouth has a particularly high incidence of collisions compared to other sections of Highway 101 within the study area. Most notable are the relatively high incidences of injury and fatal collisions, which exhibit respective annual rates of 15.9 and 1.0 collisions per hundred-million-vehicle-kilometres (HMVK).

Figure 6-2: Historical Collision Rates on Highway 101 Sections (annual collisions per HMVK)

Highway 101 Section(s)	PDO*	Injury	Fatality	Total
Digby to Weymouth	27.9	15.9	1.0	44.8
Remaining Hwy 101 sections in study area	24.7	8.5	0.5	33.6

* Property Damage Only

Assuming the new bypass would have collision rates similar to other sections of Highway 101 within the study area and that 2,500 vehicles per day would divert (from existing Trunk 1) to the bypass, the resulting impact would be a net reduction of 0.8 PDO, 1.8 injury, and 0.1 fatal collisions annually.

Average costs for each collision type were available from a 2009 highway infrastructure business case prepared for NSTIR[73]. These costs are as follows:

- PDO collisions - $6,400;
- Injury collisions - $62,200; and
- Fatal collisions - $4,528,000.

Multiplying these average costs by the net collision rate reductions above, a new bypass could be expected to reduce annual collision costs by approximately $621,000. This assumes that the collision rate on the existing Digby-Weymouth section would remain the same once the new bypass is open.

Another potential benefit of the new bypass would be improved efficiency resulting from a reduction in travel time. As previously mentioned, the bypass will have a posted speed limit of 100 km/h – compared to the 90 km/h posting on the existing section. Assuming that both the new and existing sections are 26 km in length, the increased speed limit will provide a 100-second travel time reduction for each of the 2,500 vehicles expected to use the bypass daily. Over the course of a year, this translates into a total time savings of approximately 25,300 vehicle-hrs (2,500 veh/day x 365 days/yr x 100 sec/veh ÷ 3,600 sec/hr). The value of the time savings is approximately $482,000 per year assuming an average value of time of $19 per veh-hr[74]. However a portion of these savings would be offset by local traffic which may actually experience a slight increase in travel time as a result of the new bypass.

The new bypass is expected to be the same length as the existing highway. Therefore, vehicle operating costs in terms of fuel and oil consumption, tire wear, and maintenance would not significantly change.

6.1.3 Negative Impacts

Aside from the associated costs (see Section 6.1.4), the negative impacts associated with this project are minimal. An environmental impact assessment (EIA) has already been completed and would include mitigation strategies to address any potentially negative environmental impacts.

6.1.4 Capital & Maintenance Costs

Preliminary cost estimates for the new bypass are approximately $100 million. However, no funds have been allocated for this project to date.

In addition to the construction costs, the new bypass would also add another 26 km to the existing road network that must be maintained by NSTIR. Annual maintenance costs are estimated to be $3,000[75] per lane-km. This translates into an additional $156,000 in annual maintenance costs for NSTIR.

[73] Opus International Consultants (2009), "Benefit-Cost Analysis for the Proposed Interchange between Larry Uteck Blvd. and Highway 102", NS Transportation & Infrastructure Renewal, 2009.
[74] Ibid.
[75] Annual maintenance cost was based on estimates for comparable highways in New Brunswick as described in Federal Infrastructure Funding Business Case for Route 11, Tracadie-Sheila to Six Roads Bypass prepared by Opus Consultants for New Brunswick Department of Transportation, 2007.

6.1.5 Order of Magnitude Benefit-Cost

Figure 6-3 provides a comparison of the present value of user benefits and project costs for the Digby-Weymouth Bypass. Construction is estimated to take place over two years (2011 and 2012) with capital costs evenly divided between the two years. For the purposes of this rough estimate alone, we assume the facility will enter service at the beginning of 2013. Costs and benefits are valued over the estimated 30-year life of the facility. The discount rate applied is 10 percent. The resulting benefit-cost ratio is 0.10.

Figure 6-3: Summary of Project Benefits and Costs

Present Value of Benefits	Present Value of Costs	B-C Ratio
$8.5 mil	$88.0 mil	**0.10**

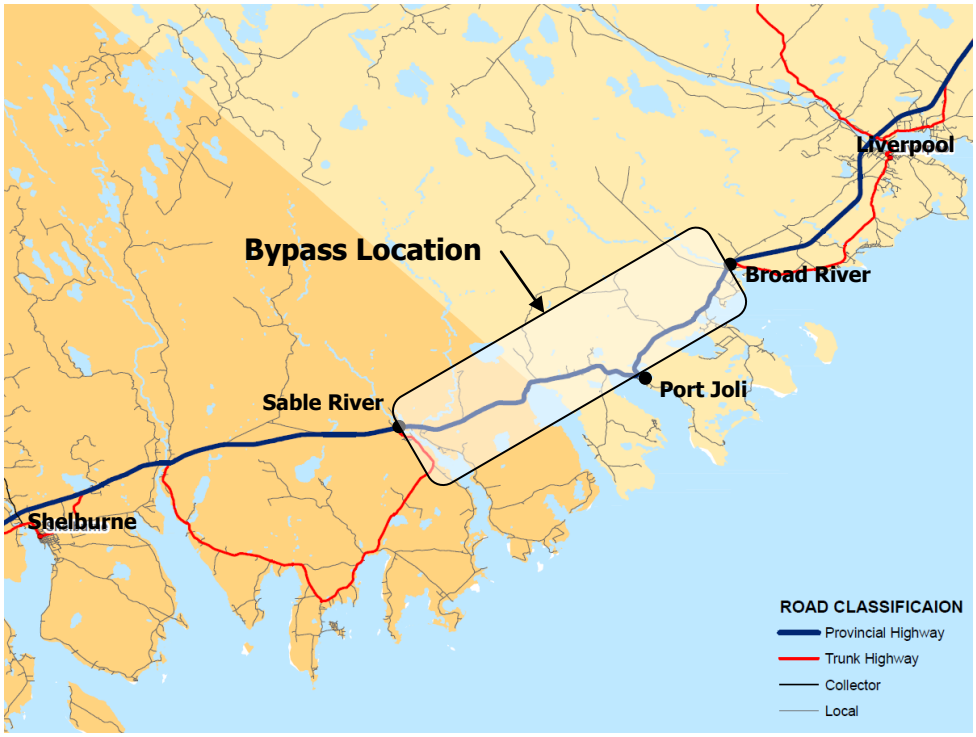
6.2 Port Mouton / Port Joli Bypass (Highway 103)

6.2.1 Description

This option would involve constructing a new 23 km roadway alignment between Broad River and Sable River to bypass the communities of Port Mouton and Port Joli (see Figure 6-4). The new alignment would be a 2-lane highway with full access control and a posted speed limit of 100 km/h. It should be noted that nearly two-thirds of the bypass would be located outside of the study area; however, SWNS stakeholders identified this section of Highway 103 as a major concern during the consultation process.

In April 2009, the Province announced plans to construct an 8.5 km section of the bypass between Broad River and Port Joli. A preliminary alignment for this section is currently being developed which were presented at an Open House in February 2010. Construction is scheduled to take place over a two- to three-year period beginning in 2011. To date, there has been no timeline or funding established for completing the remainder of the bypass between Port Joli and Sable River.

Figure 6-4: Location of Proposed Port Mouton/Port Joli Bypass



6.2.2 Positive Impacts

Similar to the Digby-Weymouth bypass, the Port Mouton / Port Joli bypass is also expected to impact positively upon highway safety. As shown in Figure 6-5, the existing section between Broad River and Sable River has a higher incidence of collisions compared to other sections of Highway 103 within the study area (which in turn is higher than comparable sections of Highway 101). Most notable is the relatively high incidences of injury collisions, which occur at an annual average rate of 25.2 collisions per HMVK.

Figure 6-5: Historical Collision Rates on Highway 103 Sections (annual collisions per HMVK)

Highway 103 Section(s)	PDO*	Injury	Fatality	Total
Broad River to Sable River	26.7	25.2	0.7	52.6
Remaining Hwy 103 sections in study area	24.2	11.4	0.7	36.3

To assess potential safety impacts, it was assumed that collision rates on the new bypass would be similar to sections of Highway 101 in the study area rather than Highway 103 - which has a lesser degree of access control. If 2,000 vehicles per day divert to the new bypass, the resulting impact would be a net reduction of 0.3 PDO, 2.8 injury, and 0.04 fatal collisions annually. Thus, applying the same collision costs previously identified, the new bypass is expected to reduce annual collision costs by approximately $354,000. Once again, this assumes that the collision rate on the existing Broad River to Sable River section will remain the same once the new bypass is open.

The bypass is also expected to offer a travel time savings for through traffic by providing an increased speed limit and a shorter route. Speed limits on the existing 27.2 km section range from 60-90 km/h. According to preliminary plans, the new bypass will be nearly 4 km shorter (23.2 km) with a posted speed limit of 100 km/h. The net result will be a travel time savings of approximately 5½ minutes per vehicle. Assuming 2,000 vehicles per day use the bypass, the total annual travel time savings will be approximately 66,900 vehicle-hrs (2,000 veh/day x 365 days/yr x 5.5 min/veh ÷ 60 min/hr) for a total annual savings of $1.27 million.

The overall reliability of the Highway 103 corridor will be improved once the bypass is constructed. Currently, there is no practical alternate routing available to motorists between Broad River and Sable River. In the event of a lengthy road closure, motorists would be forced to backtrack and take a significant diversion. For example, a trip from Shelburne to Bridgewater would require an additional 250 km of travel (via Highway 101 and Trunk 10). Similarly, a trip from Shelburne to Halifax would require an additional 220 km of travel (via Highway 101). The new bypass will provide an alternate route during future road closures, thus eliminating the likelihood for significant diversions.

6.2.3 Negative Impacts

An EIA will be required to identify any potentially negative environmental impacts and to develop appropriate mitigation strategies.

6.2.4 Capital & Maintenance Costs

Preliminary cost estimates for the new bypass total approximately $85 million, including $53 million from Broad River to Port Joli and $31 million from Port Joli to Sable River. To date, $26 million of this total has been allocated under the Building Canada Fund.

At $3,000 per lane-km, annual maintenance costs for the 23 km bypass are expected to be approximately $140,000.

6.2.5 Order of Magnitude Benefit-Cost

Figure 6-6 provides a comparison of annual user benefits and project costs for the Port Mouton / Port Joli Bypass. Construction is estimated to take place over two years (2011 and 2012) with capital costs evenly divided between the two years. For the purposes of this rough estimate alone, we assume the facility will enter service at the beginning of 2013. Costs and benefits are valued over the estimated 30-year life of the facility. The discount rate applied is 10 percent. The resulting benefit-cost ratio is 0.17.

Figure 6-6: Summary of Project Benefits and Costs

Present Value of Benefits	Present Value of Costs	B-C Ratio
$12.5 mil	$74.8 mil	**0.17**

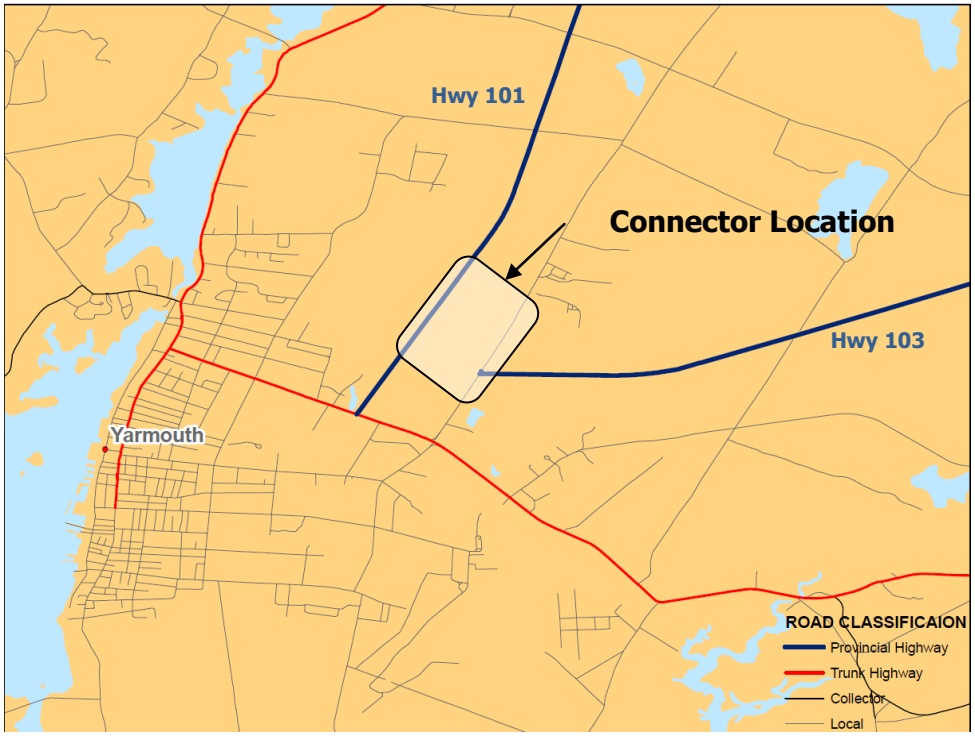
6.3 Highway 101 – Highway 103 Connector

6.3.1 Description

This option would involve extending Highway 103 in Yarmouth to provide a direct high speed connection with Highway 101. Two new grade-separated interchanges would also be constructed to provide access to the Town of Yarmouth, including a full diamond interchange at Hardscratch Road and a partial interchange at Highway 101. The location for this connector is depicted in Figure 6-7.

This connector was identified as a long-range improvement option in the recently completed Yarmouth Area Transportation Study.[76]

Figure 6-7: Location of Proposed Hwy 101 / Hwy 103 Connector



6.3.2 Positive Impacts

The new connector is expected to provide a travel time savings for through traffic in the region, which currently must travel 700 m on Hardscratch Road and 600 m on Starrs Road to make the connection between the two 100-series highways. This routing is relatively congested and requires motorists to travel through two signalized intersections. Eastbound traffic (i.e. travelling from Highway 101 to Highway 103) is also required to make two left turns.

It is estimated that the connector would reduce travel times by approximately two minutes per vehicle. However, as noted in Section 4.3, the AADT on the connector is only expected to be

[76] Atlantic Road & Traffic Management, "Yarmouth Area Transportation Study", (2008).

about 250 vehicles per day. This translates into an annual travel time reduction of 3,040 vehicle-hrs (250 veh/day x 365 days/yr x 2 min/veh ÷ 60 min/hr) for a total annual savings of $58,000. This impact could potentially be higher if traffic volumes increase as a result of future development at Hebron Industrial Park.

It is unclear whether the connector will have a positive or negative impact on traffic safety. While it is anticipated that the overall number of collisions would be reduced as a result of the controlled access, the severity of these collisions may be greater due to the higher travelling speeds. Insufficient historical collision data are available to quantify the associated safety impacts of the new connector.

6.3.3 Negative Impacts

In addition to a potential increase in the number of severe collisions, the connector may also have a slight negative impact on businesses located on Starrs Road as a result of reduced expenditures by drive-by traffic.

As with the other road improvement options, an EIA will be required to ensure that appropriate mitigation strategies are identified to address any potentially negative environmental impacts.

6.3.4 Capital & Maintenance Costs

The cost of the new connector, including the two interchanges, is estimated to be $10.5 million.[77] This does not include any costs associated with property acquisition. Annual maintenance costs for the main lanes and the ramps are expected to be about $18,000.

6.3.5 Order of Magnitude Benefit-Cost

Figure 6-8 provides a comparison of annual user benefits and project costs for the Highway 101 / Highway 103 Connector. Construction is estimated to take place over two years (2011 and 2012) with capital costs evenly divided between the two years. For the purposes of this rough estimate alone, we assume the facility will enter service at the beginning of 2013. Costs and benefits are valued over the estimated 30-year life of the facility. The discount rate applied is 10 percent. The resulting benefit-cost ratio is 0.05.

Figure 6-8: Summary of Project Benefits and Costs

Present Value of Benefits	Present Value of Costs	B-C Ratio
$0.5 mil	$9.3 mil	**0.05**

[77] Ibid.

7 Port Improvement Options

7.1 Wharf Improvement in Shelburne

The proposal to build a new wharf and an extension of the existing wharf was originally predicated on additional business from a container shipping line and a local mine. The container carrier switched ports in 2006 and mineral production and shipments have not yet materialized.

The proposed Shelburne port expansion project would include additional floating docks and a widening of the service area, with costs estimated between $10 million and $15 million depending on the configuration. According to the "Shelburne Marine Terminal Business Plan",[78] the proposed project would likely increase the revenues of the port, but also its operating costs. These additional costs could be borne by the port if it does not have to bear the capital cost associated with the project. Optimistically, the port could be expected to contribute 15 percent of the capital cost while remaining commercially viable.

The benefits of the new port infrastructure would accrue mainly to commercial users, and could be captured by the port in the form of increased fees. Other benefits include the employment benefits associated with the construction phase. In line with previous assumption, if labour costs account for about one-third of total construction costs and the opportunity cost of wages is 65 percent, employment benefits related to construction spending would represent about 10 percent of costs.

Given available information, since expected increases in costs and revenues will most likely cancel out, the benefit-cost ratio of the capital expenditure for this project could not optimistically be expected to exceed 0.4, but given construction spending should not fall below 0.1.

7.2 Summary

Figure 7-1 summarizes the analysis of the Shelburne port project.

Figure 7-1: summary of Cost-Benefit Analysis of Port Projects in Southwest Nova Scotia

Location	Benefit-Cost Ratio	Notes
Shelburne Wharf Improvement	Between 0.1 and 0.4	-

The Shelburne project relies heavily on new business materializing.

[78] MariNova Consulting Ltd., "Shelburne Marine Terminal Business Plan", Town of Shelburne, 2006; Dillon Consulting, "Shelburne Harbour Government Wharf Expansion and Service Area Construction Environmental Screening", 2006.

8 Summary of Transportation Improvement Options

This report has set out a shortlist or "menu" of transportation improvement options for SWNS in three groups: ferry options, road options, and port options.
Figure 8-1 summarizes these options in terms of a benefit-cost ratio and net economic impact.

The options with the highest benefit-cost ratio are those related to the Digby-Saint John ferry service, either using the existing vessel or a used ropax, followed by a new ropax option. Of the Yarmouth options, the best benefit-cost ratio is provided by what was the status quo until December 2009, followed by a return to operating just Yarmouth-Bar Harbor and a Yarmouth-Portland cruise ferry option. Of the road projects, the best benefit-cost ratio would come from the Port Mouton/Port Joli bypass, followed by the Digby-/Weymouth bypass.

Figure 8-1: Shortlist of Transportation Options for SWNS and Associated Costs

Transportation Option	Benefit-Cost Ratio	Net Economic Impact ($M)
Ferry Options		
1(a): Digby-Saint John Used Ropax	1.5	$141
1(a): Yarmouth-Maine High Speed	1.3	$70
1(b): Digby-Saint John Used Ropax	1.6	$144
1(b): Yarmouth-Bar Harbor High Speed	0.6-1.0	$45-70
1(d): Digby-Saint John Used Ropax	1.5	$135-140
1(d): Yarmouth-Portland Cruise Ferry	0.7-0.8	$45-$70
1(f): Digby-Saint John New Ropax	1.3	$150 -$160
1(f): Yarmouth – Bar Harbor High Speed	0.6-1.0	$45-70
1(h): Digby-Saint John New Ropax	1.3	$150 -$160
1(h): Yarmouth-Port Cruise Ferry	0.7-0.8	$45-$70
3(a): Digby-Saint John Used Ropax	1.8	$155-$165
3(b): Digby-Saint John New Ropax	1.4-1.5	$160-170
Road Options		
Digby-Weymouth Bypass (Highway 101)	0.10	
Port Mouton / Port Joli Bypass (Highway 103)	0.17	
Highway 101 – Highway 103 Connector	0.05	
Port Options		
Shelburne	0.1-0.4	

Note: Figures may not add up due to rounding.

9 Federal Policy

9.1 Marine Policy

As was discussed in the 2006 study by Belleclaire *et. al.*, there have been a number of policy initiatives that have affected the marine industry in Canada over the past 10-15 years. The National Marine Policy of 1995 stated with respect to ferry services:

> Under the National Marine Policy, the Government of Canada will continue to support all constitutionally mandated services, as well as those required by remote communities. In order to maintain essential services, it will be necessary to ensure that limited resources are applied where needed most. The government will explore means to reduce the cost of other federally subsidized ferry services currently provided by private-sector operators.[79]

The initiative to commercialize the ferry services across the Bay of Fundy, including Digby-Saint John and Yarmouth-Bar Harbor, was a direct result of the National Marine Policy. A world-wide RFP was issued in the summer of 1996, which stipulated that the services were to be operated free of subsidy after five years.

The *Canada Marine Act* of 1998, resulted in the creation of 19 new Canada Port Authorities. Other initiatives included:

- commercialization of major ports;
- divestiture of smaller regional ports;
- commercialization and transfer to provincial responsibility of some ferry services;
- transfer of the St. Lawrence Seaway to a private not-for-profit group; and
- introduction of user fees for marine navigation, ice-breaking and dredging.

There have been dozens of ports and harbours divested by the Department of Transport since 1996, including Yarmouth and Digby. Shelburne was divested by the Department of Fisheries and Oceans after initially being transferred from Transport Canada. Overall, the port divestiture program resulted in the reduction of subsidies to the port sector in Canada. This program, originally scheduled to end in 2002, has been extended to March 2012.

By legislation, the Department of Transport was mandated to initiate reviews of both the *Canada Transport Act* and the *Canada Marine Act*, both of which involved extensive consultations across the country. The *Canada Transportation Act* Review, issued in January 2001, mainly concerned itself with the Canada Port Authorities (CPAs), the St. Lawrence Seaway, and marine service fees.

After noting that there were more than 200 ferry routes in Canada, the *Canada Transportation Act* Review of 2001 listed the changes that had taken place in the provision of ferry services in Atlantic Canada in the 1990s, including the privatization of the two Bay of Fundy services. Other changes included the province of Newfoundland and Labrador taking over coastal services and

[79] "National Marine Policy", Government of Canada, 1995.

the construction of the Confederation Bridge to PEI, which replaced four ferries. The Panel made one specific recommendation relating to ferry services generally:

> The Panel endorses initiatives to reduce subsidies to ferry services and recommends that commercialization and divestiture of responsibility for local service decisions to other levels of government continue.[80]

Another panel reviewing the *Canada Marine Act* in 2002 made a recommendation regarding ferry terminals:

> Where ferry terminal facilities owned by the Government of Canada are to be divested or leased or where leases are to be renewed, such facilities should be divested or leased to local CPAs or similar bodies to ensure equal and fair access for all *bona fide* ferry operators, with the intention that no one ferry operator would enjoy an unfair monopoly.[81]

Amendments to the *Canada Transportation Act* were introduced in the House of Commons in May 2006. An examination of the legislation did not reveal any specific initiatives relating to ferry services or short sea shipping. The revised *Canada Marine Act* of 2008 also made no mention of the ferry industry nor the issue raised in the Review process.

Since 2003, Transport Canada has been very interested in the issue of short sea shipping. A number of studies[82] have examined its potential in Canada, including the east coast, but few new services have materialized. The carriage of commercial cargo by ferry across the Bay of Fundy fits most descriptions of short sea shipping.

9.1.1 Federal funding of ferry services

The 2006 Belleclaire study also examined the issue of government funding for ferry services in Canada. The only constitutionally-mandated ferry service links Port aux Basques, NL with North Sydney, NS. Other federally supported services include the following:

Province	Service	Constitutional / Remote
NL-NS	North Sydney – Port aux Basques	Constitutional
NL-NS	North Sydney - Argentia	No
PEI-NS	Wood Islands-Caribou	No
NS-NB	Digby-Saint John	No
QC-PEI	Cap aux Meules-Souris	Remote
BC	Various	Some remote

Source: Belleclaire et.al., "Digby-Saint John Ferry Service: Issues and Options", 2006.

Most provincial governments also contribute to the provision of ferry services in Canada, the only exception being PEI. Certain ferry services operating in BC and Quebec receive a federal

[80] "Vision and Balance: *Canada Transportation Act* Review", June 2001.
[81] *Canada Marine Act* Review., p. 45.
[82] MariNova Consulting Ltd. And Dr. Mary R. Brooks, "Short Sea Shipping Background Study", Transport Canada, 2003; MariNova Consulting Ltd., "Short Sea Shipping Market Study", Transport Development Centre, 2005; Dalhousie University and MariNova Consulting Ltd., "Short Sea Shipping on the East Coast of North America", Transport Canada, 2006; CPCS, "Eastern Canada Hub-and-Spoke Container Transshipment Study", Transport Canada, 2008; CPCS, "Lake Erie Ferry Study", Municipality of Bayham, 2009; CPCS, "Durham Region Short Sea Shipping Study", Durham Region, 2010.

contribution to assist in the provision of service to remote regions. In the 2008-2009 fiscal year, BC received $26.3 million.[83]

[83] B.C. Ferries, "2009-2010 Business Plan", March 2010.

10 Conclusion

Most transportation infrastructure in SWNS is currently well under capacity, but certain local issues do exist, and are identified in this Report. As the consulting team heard in both the sector meetings and public consultations, there are concerns about the age of the *Princess of Acadia* and its eventual replacement, but the *uncertainty* over the future of ferry services in the region is the paramount concern.

Residents and businesses alike indicated the loss of ferry service would leave the region isolated and would be a major blow to those stakeholders who are leading efforts to attract investment and new residents to locate there, and to retain those businesses and people already in the region. On the other hand, many stakeholders feel that a long term commitment to maintaining ferry service would have a tremendously positive effect on the region.

The ferry service, particularly Digby-Saint John, is considered by stakeholders in SWNS to be an integral part of the region's infrastructure. It is critical to the $600-million commercial fishery, which is increasingly a "fresh fishery" and requires quick and reliable transportation to reach early morning markets in Boston. Of all sectors in the SWNS economy, seafood has the highest backward linkages into the regional economy (i.e. boatbuilding, fishing gear, fuel sales, trucking, provisioning, etc). It is also increasingly interlinked with the (estimated) $100-million mink industry, which provides backhaul cargo to seafood shippers (via the ferry service).

Even though traffic levels have declined in recent years, several key industries, including the fishery, agriculture and tourism, remain reliant upon the ferry service to move products to market and bring visitors to the region. In the case of the fishery, it is not uncommon to have 8-10 truckloads of fresh seafood onboard the *Princess of Acadia*, representing upwards of $2 million worth of product on one sailing.

There are some basic infrastructure and service items a community needs, and transportation infrastructure is one of them. It is also difficult to attract people and investment if a location is difficult to access. The ferry system of SWNS is an important link to markets in the US and Central Canada, and allows tourists to access the region without having to double-back. Without the ferry system (both Yarmouth and Digby) the region would be more isolated.

Issues affecting the US tourism market (including 9/11, the passport issue, dollar exchange rates, and high fuel prices, and cruise industry growth), combined with a reduction in capacity on the Yarmouth-Maine services, have resulted in a decline in the total number of passengers using the ferry services in SWNS.

While the road network in SWNS is below capacity, there are some improvements which could be considered beneficial. Two roads in particular are 1) Highway 101 between Digby and Weymouth, which is the last remaining section of Trunk 1 with uncontrolled access; and 2) Highway 103 between Sable River and Summerville Centre, where a serious accident would force motorists to drive all the way back and around via Highway 101.

Yarmouth Airport has had its challenges in recent years. With $2 million in assistance from the province, Starlink Airlines had been providing air service to Halifax and Portland since February 2009. This service ended on December 1, 2009, but a replacement was announced in March 2010. The Yarmouth Airport Authority has indicated that it will concentrate its efforts on supporting the new service, attracting air cargo services and a flight school to its facility. The airport in Digby is looking to high end fly-in tourists and linking up with the Digby Pines Resort to appeal to a similar type of tourist as is attracted to Fox Harb'r resort in Wallace and Crowne Jewel Resort Ranch in Cape Breton.

The ferry configuration options with the highest benefit-cost ratio are those related to the Digby-Saint John crossing, using a used ropax, followed by a new ropax option. Of the Yarmouth options, the highest benefit-cost ratio is provided by what was the status quo until December 2009, followed by a return to operating just Yarmouth Bar Harbor, and a Yarmouth-Portland cruise ferry option. Of the road projects, the highest benefit-cost ratio would come from the Port Mouton/Port Joli bypass, followed by the Digby/Weymouth bypass.

Appendix A: Stakeholder Consultations

A series of sector and public consultations took place from November 9-18 inclusive. Public meetings were held in the following communities:

1. Digby
2. Church Point
3. Yarmouth
4. Middleton
5. Shelburne

In addition, the two RDAs and the City of Saint John organized a total of 13 sector meetings, with representatives of the fishing, tourism, manufacturing and trucking industries, as well as mayors and wardens of Annapolis, Digby, Yarmouth and Shelburne counties.

The consultants outlined the study objective, meeting purpose, the methodology and schedule, and deliverables.

This was followed by a 15-20 minute presentation of regional economic drivers, the role of transportation, traffic and passenger flows by sector.

The main part of each meeting was devoted to discussion of problems and issues, followed by key economic opportunities, suggested changes and improvements, and then a recap of the deliverables and project schedule.

Appendix B: Detailed Ferry Traffic Data and Forecasts[84]

Figure B-1: Digby-Saint John Ferry Passenger Traffic Data and Forecast, 2010-2019

Year	Intermediate			Low			High		
	PAX	PRVs	% chng	PAX	PRVs	% chng	PAX	PRVs	% chng
2001	170,796	48,069							
2002	169,365	47,959	-0.2%						
2003	153,948	43,140	-10.0%						
2004	147,886	41,086	-4.8%						
2005	140,209	39,980	-2.7%						
2006	133,389	36,606	-8.4%						
2007	119,009	35,169	-3.9%						
2008	115,963	33,497	-4.8%						
*2009	106,000	30,675	-8.4%	106,000	30,675	-8.4%	106,000	30,675	-8.4%
2010	103,820	31,900	4.0%	97,830	30,060	-2.0%	105,820	32,520	6.0%
2011	104,860	32,220	1.0%	95,880	29,460	-2.0%	107,940	33,170	2.0%
2012	105,910	32,540	1.0%	93,960	28,870	-2.0%	110,100	33,830	2.0%
2013	106,970	32,870	1.0%	93,960	28,870	0.0%	112,300	34,510	2.0%
2014	108,040	33,200	1.0%	93,960	28,870	0.0%	114,540	35,200	2.0%
2015	109,120	33,530	1.0%	93,960	28,870	0.0%	116,830	35,900	2.0%
2016	110,210	33,860	1.0%	93,960	28,870	0.0%	119,170	36,620	2.0%
2017	111,310	34,200	1.0%	93,960	28,870	0.0%	121,550	37,350	2.0%
2018	112,430	34,540	1.0%	93,960	28,870	0.0%	123,990	38,100	2.0%
2019	113,550	34,890	1.0%	93,960	28,870	0.0%	126,460	38,100	0.0%

Source: Historical data from Bay Ferries, forecast from *Digby to Saint John Ferry Service: Economic Impact Assessment Update*. Opus international Consultants Canada Ltd. 2009

[84]. It is recognized that 2009 data are available as of the time the Final Report was issued, however, the the forecasts were finalized in the fall of 2009. Data are based on actual to end 2008 and forecasts from 2009 onwards.

Figure B-2: Digby-Saint John Ferry Commercial Traffic Data and Forecast, 2010-2019

Year	Intermediate		Low		High	
	CRVs	% chng	CRVs	% chng	CRVs	% chng
2001	21,690					
2002	15,709	-27.6%				
2003	14,143	-10.0%				
2004	15,088	6.7%				
2005	16,555	9.7%				
2006	15,383	-7.1%				
2007	9,370	-39.1%				
2008	11,022	17.6%				
2009	8,890	-19.3%	8,890	-19.3%	8,890	-19.3%
2010	10,430	17.3%	8,890	0.0%	11,050	24.3%
2011	11,970	14.8%	8,890	0.0%	13,210	19.5%
2012	13,500	12.8%	8,890	0.0%	15,380	16.4%
2013	13,640	1.0%	8,980	1.0%	15,690	2.0%
2014	13,770	1.0%	9,070	1.0%	16,000	2.0%
2015	13,910	1.0%	9,160	1.0%	16,320	2.0%
2016	14,050	1.0%	9,250	1.0%	16,650	2.0%
2017	14,190	1.0%	9,340	1.0%	16,980	2.0%
2018	14,330	1.0%	9,440	1.1%	17,320	2.0%
2019	14,470	1.0%	9,530	1.0%	17,670	2.0%

Source: Historical data from Bay Ferries, forecast from *Digby to Saint John Ferry Service: Economic Impact Assessment Update*. Opus international Consultants Canada Ltd. 2009

Figure B-3: Yarmouth-Maine Ferry Traffic Data and Forecast, 2010-2019

Year	Intermediate			Low			High		
	PAX	PRVs	% chng	PAX	PRVs	% chng	PAX	PRVs	% chng
2001	309,583	67,647							
2002*									
2003	294,498	66,874							
2004	242,334	60,752	-9.2%						
2005	149,507	42,100	-30.7%						
2006	120,561	34,738	-17.5%						
2007	104,797	30,910	-11.0%						
2008	84,518	25,376	-17.9%						
2009	81,734	25,838	1.8%	81,734	25,838	1.8%	81,734	25,838	1.8%
2010	78,950	26,300	1.8%	74,400	24,800	-4.0%	78,900	26,300	1.8%
2011	80,550	26,800	1.9%	72,900	24,300	-2.0%	81,300	27,100	3.0%
2012	81,350	27,100	1.1%	71,400	23,800	-2.1%	82,900	27,600	1.8%
2013	82,150	27,350	0.9%	70,700	23,600	-0.8%	84,200	28,100	1.8%
2014	83,000	27,600	0.9%	70,000	23,300	-1.3%	85,400	28,500	1.4%
2015	83,800	27,900	1.1%	69,300	23,100	-0.9%	86,700	28,900	1.4%
2016	84,650	28,150	0.9%	69,300	23,100	0.0%	87,600	29,200	1.0%
2017	85,500	28,450	1.1%	69,300	23,100	0.0%	88,500	29,500	1.0%
2018	86,350	28,750	1.1%	69,300	23,100	0.0%	89,300	29,800	1.0%
2019	87,200	29,050	1.0%	69,300	23,100	0.0%	90,200	30,100	1.0%

*Bay Ferries only.

Source: Historical data from Bay Ferries.

Appendix C: Calculating Road Capacity

The capacity of the roadways in the study area was analyzed following the procedures in the *Highway Capacity Manual 2000*[85] (HCM). The HCM contains separate procedures for analyzing a wide range of facilities including:

- Two-lane and multi-lane highways;
- Roadway segments and intersections; and
- Roadways with interrupted and uninterrupted traffic flows.

The scope of the analysis for this study was limited to two-lane roadway segments with uninterrupted traffic flows (i.e. no traffic signals). A planning level analysis was completed based on input data typical for the region as a whole. The purpose of the analysis was to identify highway corridors that have either reached or exceeded their capacity for operating at a level of service (LOS) C or better. Level of service is defined in the manual as:

> A qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. (p. 5-8)

Levels of service range from LOS A to LOS F. A description of conditions for each level is provided in the following table for two and four lane highways.

Figure C-1: Level of Service Classification for 2-Lane Highways

LOS	2-Lane Highways
A	The highest quality of traffic service when motorists are able to travel at their desired speeds. Passing demand is well below passing capacity and platoons of three or more vehicles are rare.
B	The demand for passing to maintain desired speeds becomes significant and approximates the passing capacity.
C	Increases in traffic flow result in noticeable increases in platoon formation, platoon size, and frequency of passing impediment. Although traffic flow is stable, it is susceptible to congestion due to turning traffic and slow-moving vehicles.
D	This level describes unstable traffic flow where turning vehicles and roadside distractions cause major shock waves in the traffic stream. Passing becomes extremely difficult as passing demand is high and passing capacity approaches zero.
E	Passing is virtually impossible and platooning becomes intense, as slower vehicles or other interruptions are encountered.
F	Heavy congested flow with traffic demand exceeding capacity. Volumes are lower than capacity and speeds are highly variable.

According to the HCM, efficient mobility is the principal function of major two-lane highways such as the 100-series highways that connect major traffic generators or that serve as primary

[85] Highway Capacity Manual 2000. Transportation Research Board, Washington, D.C.

links in national or provincial highway networks. These routes tend to serve long-distance commercial and recreational travellers, and long sections may pass through rural areas without traffic control interruptions. Trunks 8 and 10 would also meet these criteria. Consistent high speed operations and infrequent passing delays are desirable for these facilities. Average travel speed is used as the primary performance measure for assessing operations on these facilities (referred to as Class I highways in the HCM).

Other paved, two-lane rural highways such as Trunks 1 and 3 serve for accessibility, scenic or recreational routes where high speed is not the principal concern. Delay – as indicated by the formation of platoons of vehicles – is more relevant as a measure of service quality on these roads. Percent-time-following is the criteria for assessing operations on roads where drivers do not have an expectation of high speeds (i.e. Class II highways in the HCM). Figure C-2 presents the input values used for the level of service analyses.

Figure C-2: Input Values for Level of Service Analysis

Input Value	2-lane, Class I	2-lane, Class II
free flow speed	100 km/h	70 km/h
access points/km or interchange density	5 access/km	5 accesses/km
% no passing	50	
peak hour factor	0.88	
% trucks	10	
directional split in traffic flows	40/60	
terrain	Rolling	
lane width	3.7 m	
shoulder width	1.8 m	

The results of the analysis are the maximum volumes that can be accommodated on each facility while maintaining a LOS C or better. Figure C-3 presents the hourly service volumes at LOS C for the two facility types analyzed. Traffic volumes greater than the values in Figure C-3 would likely result in a LOS D or lower for typical conditions in the study area.

Figure C-3: Hourly Service Volumes at LOS C

Facility	Hourly Service Volume at LOS[1] C	Range in AADT[2] Volume at LOS C
2-lane, Class 1 arterial highway	700	4,700 to 7,000
2-lane, Class 2 arterial highway	840	5,600 to 8,400

1. LOS = level of service
2. AADT = annual average daily traffic

Level of service and capacity analyses are based on hourly traffic volumes. Generally, the peak hour of traffic flow during a day represents 10 to 15 percent of the annual average daily traffic (AADT volume). This percentage is referred to as the k-factor. The range in AADT volumes provided in Figure C-3 was based on these typical k-factors. If the AADT volume on a highway is below this range, then it likely has additional capacity before dropping below LOS C; if the

AADT volume is within the range, then it is reaching the limit of LOS C; if the AADT volume is above this range then it is probably operating below LOS C.

Appendix D: Detailed Economic Impact Methodology for Saint John - Digby Ferry Service

The purpose of this Appendix is to provide a brief explanation of the methodology used to calculate the costs and benefits associated with ferry operations. When necessary, an example of such calculations is provided.

Direct Impacts from Ferry Operations

The direct impact of ferry operations can be divided between the effect of wages and the effect of expenditures on goods and services. For example, for 2009 direct wages associated with the St-John ferry service are estimated at $4.2 million, while non-fuel expenditures on other goods and services are estimated at approximately $8.0 million.

Benefits associated with wage payments depend on the opportunity cost of wages, that is, how much of these wages represents new economic activity that would not otherwise take place. In their 2007 study on the same subject, Opus established the opportunity cost of wages at 85 percent for the Saint John area, wherein most of the New Brunswick impact occurs, and at 65 percent for the Digby area. Based on the above parameters the economic impact of direct wages is calculated to be $0.798 million ($3.360 x.15 + $0.84 x .35).

Benefits associated with other spending depend on the opportunity cost as well as the leakage factor (how much of the spending is paying for value added). In this study, as was the case for the 2007 Opus study, a leakage factor of 50 percent and a blended opportunity cost of 75 percent are assumed. In our example, the net impact of the $8 million expenditures is estimated to be $1.0 million ($8 * 0.5 * (1 – 0.75)).

Commercial User Impacts

The benefits for commercial users represent the cost-savings of using the ferry rather than driving around. The incremental cost of driving around is computed as follows for each type of truck:

- Commercial Benefits of ferry = Number of truck * cost per km * distance – cost of using the ferry

In 2009, cost estimates for tractor trailer were $1.80 per kilometre and for straight truck $1.37 per kilometre. For the Digby-Saint John ferry service, the consulting team estimated that commercial users would, on average, be faced with 570 kilometres of additional travel.

It is important to note the presence of some intangibles with respect to the shipment of fish products. For most areas in southwest Nova Scotia, the ferry provides a time savings of several hours which translates into a fresher and higher valued product. In addition, lobster mortality

is said to be increased by the time, distance and vibration of extra highway travel. No impact calculation is available for the freshness or mortality factors.

Tourism Impacts

Tourism impacts are calculated by measuring the spending that would not occur in the region if the service were terminated. Three key estimates are necessary:

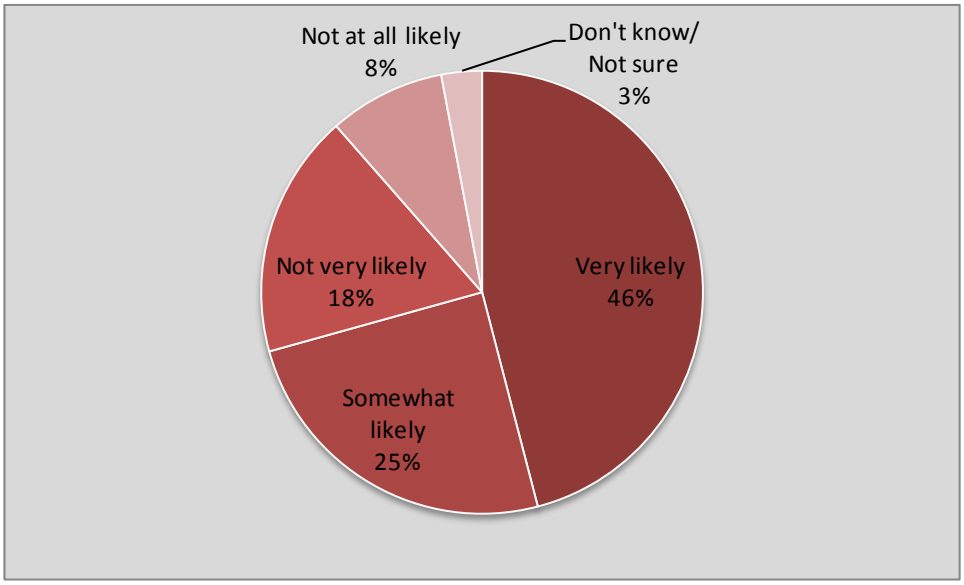
- Number of tourists unlikely to travel to Nova Scotia or New Brunswick if the service is terminated
- Average number of days spent in the region
- Average spending per day

By multiplying these three variables, we obtain the estimated tourism spending associated with the service. In this study, we first remove residents of Nova Scotia and New Brunswick from the total number of passengers.

A 2008 survey of *Princess of Acadia* passengers[86] which included a question on the likelihood of travelling to their destination if the ferry service did not exist, is used to estimate the number of tourists unlikely to travel if the service did not exist. The results are shown in Exhibit 6-3.

[86] The *Princess of Acadia* Passenger Study 2008, completed by Corporate Research Associates Inc. for Bay Ferries, November 2008

Exhibit 0-1: Likelihood of Travelling to Destination if Ferry Service did not Exist



If it is assumed that half of the "not very likely" category will continue travelling to their destination and half will not, then approximately 20 percent of the visitors would not have travelled to their destination if the ferry service did not exist.

The same survey provided information on the length of stay (6.3 days in Nova Scotia and 1.9 days in New Brunswick.

Finally, the average spending was ascertained using a 2004 visitor exit study for Nova Scotia ($67 per person-day). This estimate was adjusted using the consumer price index (increasing it to $73 per person-day in 2009), and was used for both Nova Scotia and New Brunswick.
An example of such calculations is presented in the following table.

Exhibit 0-2: Net Impact of Ferry on Tourism Expenditures

Tourism Impacts	Nova Scotia	New Brunswick
Total visitors entering by ferry	40,500	45,000
Total expenditures per day (total visitors x $73)	$2,956,500	3,285,000
Average # days	6.3	1.9
Total expenditures per visit (# days x expenditures/day)	$18,625,950	$6,241,500
Net expenditures or impact (total x 0.20)	$3,725,190	$1,248,300

It cannot be over emphasized that these net economic impacts will be unevenly distributed. For instance, it is anticipated that the loss of the ferry service would have a higher negative impact

upon the tourist industry in Digby and the surrounding areas of southwest Nova Scotia. Other Nova Scotia areas would experience some net increase.

Passenger User Impacts

Passenger impacts are measured in a similar fashion as commercial impacts. The only exception is that a value for time saved is added. The key estimates needed are:

- Number of passengers that would still travel to their destination
- Number of passengers savings money by using the ferry
- Number of cars needed (or average number of passenger per car)
- Average number of kilometres avoided
- Cost per kilometre

The number of passengers travelling is estimated by removing the passengers cancelling their trips, as measured in the previous section (20 percent for the Digby-Saint John service).
In the 2008 passenger survey for the Digby-Saint John ferry service noted above, 80 percent of the respondents stated that they took the ferry because it reduced the amount of driving, saved time or gas, or was a more convenient route. We assume that only these passengers are savings money by using the ferry. As a result, we remove an additional 20 percent of passengers.

Based on historical traffic statistics, there was an average of 3.5 passengers for each vehicle on the Digby-Saint John ferry service.

We assume that each passenger would have to drive the 570 kilometres between Digby and Saint John.

The cost of driving is obtained by using an average vehicle operating cost estimated by the Canadian Automobile Association ($0.46 per km in 2009), and adjusted for inflation.

The average time saved was estimated at 2 hours. An average value of $12.30 was used for the additional travel time based on the methodology recommended in the Transport Canada Guide to Benefit-Cost Analysis.[87] This represents half the average wage.

Using these assumptions, the number of cars impacted is estimated as:

- Number of cars impacted = [Total passengers * proportion still travelling (80% for SJ) * proportion saving money (80% % for SJ)] / Average passengers per car (3.5)

[87] Guide to Benefit Cost Analysis in Transport Canada (1994). Available from www.tc.gc.ca/eng/corporate-services/finance-bca-101.htm, *accessed October 19, 2009.*

In turn, the benefits are estimated as:

- Passenger benefits = Number of cars impacted * [distance saved (570km) * cost per km ($0.46 in 2009) + time saved (2 hours) * value of time (12.30 per hour)]

Tourism Information Centre Employment

The Nova Scotia Department of Tourism, Culture, and Heritage operates a Visitor Information Centre at Digby. The impacts of employment losses at the tourism information centre are calculated in the same way as other wage payments.

Total wage payments are estimated and then multiplied by a factor reflecting the opportunity cost of 65 percent in Nova Scotia.

Other Impacts and Externalities

In previous sections, the number of CRVs and PRVs that would continue to travel between Saint John and Digby on the highway if the service did not exist was estimated. As noted earlier, these vehicles would drive an additional 570 km on average if the ferry service was not in place. Potential impacts from the increase in highway traffic include more accidents, higher levels of greenhouse gas emissions, and faster deterioration of the highways. The assumptions behind each of these estimates are presented below.

Accident Costs

Highway accident statistics are typically reported per million-vehicle-km. The Figure below contains a weighted average of existing accident rates for the highway network between Digby and Saint John. The accident rates include both passenger and commercial vehicles.

Exhibit 0-3: Average Annual Number of Accidents per Million Vehicle Kilometres

Highway Segment	Length (km)	PDO	Injury	Fatality	Total
Highway 101 (Digby to Hwy 102)	212	0.212	0.103	0.006	0.328
Highway 102	103	0.220	0.114	0.002	0.336
Highway 104 (Truro to Amherst)	**166**	**0.206**	**0.112**	**0.005**	**0.323**
Route 2 (Amherst to Moncton)	56	0.215	0.099	0.011	0.325
Route 1 (Moncton to Saint John)	144	0.361	0.163	0.006	0.531
Weighted Average	**not applic**	**0.243**	**0.119**	**0.006**	**0.368**

PDO = property damage only

From these data, the number of additional accidents for each type can be estimated as follows:

- Estimated Traffic * average number of kilometres driven * average number of accidents per km

To estimate benefits, the number of avoided accidents is multiplied by the average accident costs from 2009 business cases for highway projects in Nova Scotia and New Brunswick[88,89]. The costs were estimated at $4.5 million per fatality; $62,000 per injury accident; and $6,400 per pdo accident.

Greenhouse Gas Emissions

Emissions were estimated based on the following assumptions:

- Fuel consumption rates of 10.9 litres per 100 km for PRVs[90] and 50 litres per 100 km for CRVs[91];
- Fuel consumption of the ferry as reported by Bay Ferries;
- Emission factors by transportation mode as reported by Environment Canada in the National Inventory Report: Greenhouse Gas Sources and Sinks in Canada, 1990-2006[92];
- Carbon dioxide equivalents of 21 for methane and 310 for nitrous oxide[93]; and
- A unit cost of $23.00 per tonne for CO_2 emissions as reported in 2006 by the Victoria Policy Institute ($21.85 adjusted for inflation).

An estimate of CO_2 equivalent emissions were estimated for both the road traffic and the ferry traffic. These estimates were then multiplied by the price of carbon. The cost of the ferry in terms of emissions was estimated as the cost of ferry emissions minus the cost of road traffic emissions.

[88] Benefit-Cost Analysis of Proposed Interchange between Larry Uteck Blvd and Highway 102, Halifax Regional Municipality (2009), completed for Nova Scotia Department of Transportation and Infrastructure Renewal, prepared by Opus International Consultants.
[89] Route 1 Business Case: Murray Road to Pennfield (2009), prepared for the New Brunswick Department of Transportation, prepared by Opus International Consultants.
[90] US Environmental Protection Agency Emission Facts: Average Annual Emissions and Fuel Consumption for Passenger Cars and Light Trucks (2000), available from http://www.epa.gov/OMS/consumer/f000013.htm, accessed October 2, 2009.
[91] Victoria Policy Institute (2008). Freight Transport Management, Increasing Commercial Vehicle Transport Efficiency, available from http://www.vtpi.org/tdm/tdm16.htm, accessed October 21, 2009.
[92] Available at http://www.ec.c.ca/pdb/ghg/inventory_report/2006_report/a12_eng.cfm
[93] US Environmental Protection Agency, Emission Facts, Metrics for Expressing Greenhouse Gas Emissions: Carbon Equivalents and Carbon Dioxide Equivalents, available at http://www.epa.gov/OMS/climate/420f05002.htm, accessed October 21, 2009.

Other Factors

Extra highway traffic will affect highway capacity (potentially causing build-sooner costs), and cause extra wear and tear on roadway surfaces (resulting in additional maintenance and rehabilitation costs in 2008). Given the relatively low volume of traffic involved (an extra 90 vehicle per day on regional roads), these impacts on highway capacity and operations maintenance have not been quantified but should certainly be noted as a potential impact.

Projections and Present Value

These impacts were projected in the future using the following assumptions:

- The costs of service delivery remain the same in constant dollars;
    - Commercial vehicle traffic impacts vary in direct proportion to the change in projected commercial traffic levels;
    - Passenger and tourism benefits vary in direct proportion to the change in projected passenger traffic levels;
    - Impacts stemming from the Tourism Information Centre remain unchanged;

The present value of these impacts is obtained by using a discount rate of 10 percent.

Appendix E: Detailed Cost and Revenue Estimates for Ferry Improvement Options

Figure E-1: Projected Expenses for Option 1(a): Digby-Saint John Ropax ($2010 millions)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Vessel											
Capital / Interest	16.000	12.000	6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	59.375
Fuel	3.500	5.544	5.544	5.544	5.544	5.544	5.544	5.544	5.544	5.544	35.428
Crew	2.829	2.829	2.829	2.829	2.829	2.829	2.829	2.829	2.829	2.829	19.121
Maintenance	2.500	2.000	2.000	2.250	2.250	2.500	2.500	2.750	2.750	3.000	16.128
Lay-Up Costs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*25.329*	*22.873*	*17.567*	*17.817*	*17.817*	*18.067*	*18.067*	*18.317*	*18.317*	*18.567*	133.432
Terminal & Admin											
Labour	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	8.787
Maintenance	1.092	0.708	1.378	0.501	4.431	2.000	2.000	2.000	2.000	2.000	11.456
Administration	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	10.139
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*4.392*	*4.008*	*4.678*	*3.801*	*7.731*	*5.300*	*5.300*	*5.300*	*5.300*	*5.300*	33.760
Total Expenses	***29.721***	***26.881***	***22.245***	***21.618***	***25.548***	***23.367***	***23.367***	***23.617***	***23.617***	***23.867***	***167.1***
Revenue	***9.797***	***10.732***	***11.322***	***11.423***	***11.560***	***11.662***	***11.800***	***11.904***	***12.008***	***12.148***	***76.153***
Expenses - Revenue	***19.924***	***16.149***	***10.923***	***10.195***	***13.988***	***11.705***	***11.567***	***11.713***	***11.609***	***11.719***	***91.039***

Figure E-2: Projected Net Economic Impacts for Option 1(a): Digby-Saint John Ropax ($ millions)

Economic Impact	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Commercial Traffic	6.405	7.352	8.294	8.376	8.460	8.545	8.630	8.717	8.804	8.892	54.543
Tourism Impacts	5.222	5.541	5.596	5.652	5.708	5.766	5.823	5.881	5.940	6.000	38.230
Passenger Traffic	4.200	4.456	4.501	4.546	4.591	4.637	4.684	4.730	4.778	4.825	30.748
Accident Costs	0.640	0.698	0.735	0.742	0.749	0.757	0.765	0.772	0.780	0.788	4.947
GHG Emissions	-0.030	-0.030	-0.032	-0.032	-0.033	-0.033	-0.033	-0.034	-0.034	-0.034	-0.220
Ferry Service Employment	0.814	0.814	0.814	0.814	0.814	0.814	0.814	0.814	0.814	0.814	5.502
Other Service Expenditures	1.020	1.020	1.020	1.020	1.020	1.020	1.020	1.020	1.020	1.020	6.894
Tourism Information Centre	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.270
CBSA Services	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Net Economic Impacts	**18.311**	**19.889**	**20.967**	**21.158**	**21.351**	**21.545**	**21.742**	**21.941**	**22.141**	**22.344**	**140.914**

Figure E-3: Projected Expenses for Option 1(a): Yarmouth-Maine High Speed Ferry ($ millions)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Vessel											
Capital / Interest	6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	45.245
Fuel	3.093	3.093	3.093	3.093	3.093	3.093	3.093	3.093	3.093	3.093	20.906
Crew	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	8.881
Maintenance	1.500	1.500	1.500	1.600	1.700	1.800	1.900	2.000	2.100	2.200	11.596
Lay-Up Costs	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	6.759
Other	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	6.759
Subtotal	*14.601*	*14.601*	*14.601*	*14.701*	*14.801*	*14.901*	*15.001*	*15.101*	*15.201*	*15.301*	100.146
Terminal & Admin											
Labour	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	6.759
Maintenance	2.468	0.631	1.170	1.748	1.475	2.000	2.000	2.000	2.000	2.000	11.508
Administration	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	16.898
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*6.468*	*4.631*	*5.170*	*5.748*	*5.475*	*6.000*	*6.000*	*6.000*	*6.000*	*6.000*	38.544
Total Expenses	***21.069***	***19.232***	***19.771***	***20.449***	***20.276***	***20.901***	***21.001***	***21.101***	***21.201***	***21.301***	***138.689***
Revenue	***12.224***	***12.413***	***12.516***	***12.615***	***12.715***	***12.815***	***12.917***	***13.020***	***13.123***	***13.229***	***85.677***
Expenses - Revenue	***8.845***	***6.819***	***7.255***	***7.834***	***7.561***	***8.086***	***8.084***	***8.081***	***8.078***	***8.072***	***53.013***

Figure E-4: Projected Net Economic Impacts for Option 1(a): Yarmouth-Maine High Speed Ferry ($ millions)

Economic Impact	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Commercial Traffic	0.198	0.198	0.198	0.198	0.198	0.198	0.198	0.198	0.198	0.198	1.338
Tourism Impacts	4.969	5.068	5.119	5.170	5.222	5.274	5.327	5.380	5.434	5.488	35.164
Passenger Traffic	3.136	3.199	3.231	3.263	3.296	3.239	3.362	3.396	3.429	3.464	22.192
Accident Costs	0.500	0.510	0.515	0.520	0.525	0.531	0.536	0.541	0.547	0.552	3.538
GHG Emissions	-0.040	-0.041	-0.041	-0.042	-0.042	-0.042	-0.043	-0.043	-0.044	-0.044	-0.283
Ferry Service Employment	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480	0.480	3.244
Other Service Expenditures	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	0.539	3.643
Tourism Information Centre	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.541
CBSA Services	0.158	0.158	0.158	0.158	0.158	0.158	0.158	0.158	0.158	0.158	1.065
Total Net Economic Impacts	**10.020**	**10.191**	**10.278**	**10.366**	**10.456**	**10.546**	**10.636**	**10.728**	**10.821**	**10.915**	**70.442**

**Figure E-5: Projected Expenses for Option 1(b):
Yarmouth-Bar Harbor Seasonal High Speed Ferry ($ millions)**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Vessel											
Capital / Interest		6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	38.551
Fuel		3.931	3.931	3.931	3.931	3.931	3.931	3.931	3.931	3.931	22.639
Crew		1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	1.314	7.567
Maintenance		1.500	1.500	1.600	1.700	1.800	1.900	2.000	2.100	2.200	10.096
Lay-Up Costs		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	5.759
Other		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	5.759
Subtotal		*15.439*	*15.439*	*15.539*	*15.639*	*15.739*	*15.839*	*15.939*	*16.039*	*16.139*	92.371
Terminal & Admin											
Labour		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	5.759
Maintenance	2.480	0.631	1.170	1.748	1.475	2.000	2.000	2.000	2.000	2.000	11.520
Administration		2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	2.500	14.398
Other		0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	2.880
Subtotal	*2.480*	*4.631*	*5.170*	*5.748*	*5.475*	*6.000*	*6.000*	*6.000*	*6.000*	*6.000*	34.556
Total Expenses	***2.480***	***20.070***	***20.609***	***21.287***	***21.114***	***21.739***	***21.839***	***21.939***	***22.039***	***22.139***	***124.926***
Revenue		***9.188***	***9.283***	***9.374***	***9.467***	***9.560***	***9.655***	***9.750***	***9.846***	***9.943***	***54.733***
Expenses - Revenue	***2.480***	***10.882***	***11.326***	***11.913***	***11.647***	***12.179***	***12.184***	***12.189***	***12.193***	***12.196***	***70.194***

Figure E-6: Projected Expenses for Option 1(d): Yarmouth-Portland Seasonal Cruise Ferry ($ millions)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Vessel											
Capital / Interest		6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	38.551
Fuel		4.608	4.608	4.608	4.608	4.608	4.608	4.608	4.608	4.608	26.538
Crew		5.400	5.400	5.400	5.400	5.400	5.400	5.400	5.400	5.400	31.099
Maintenance		3.650	3.650	3.650	3.750	3.850	3.950	4.050	4.150	4.150	22.033
Lay-Up Costs		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	5.759
Other		0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	2.880
Subtotal		*21.852*	*21.852*	*21.852*	*21.952*	*22.052*	*22.152*	*22.252*	*22.352*	*22.352*	126.859
Terminal & Admin											
Labour		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	5.759
Maintenance	1.665	0.315	0.315	0.418	1.335	1.000	1.000	1.000	1.000	1.000	6.027
Administration		3.500	3.500	3.500	3.500	3.500	3.500	3.500	3.500	3.500	20.157
Other		0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	2.880
Subtotal	*1.665*	*5.315*	*5.315*	*5.418*	*6.335*	*6.000*	*6.000*	*6.000*	*6.000*	*6.000*	34.822
Total Expenses	***1.665***	***27.167***	***27.167***	***27.270***	***28.287***	***28.052***	***28.152***	***28.252***	***28.352***	***28.352***	***161.680***
Revenue		***22.061***	***22.267***	***22.474***	***22.684***	***22.896***	***23.110***	***23.326***	***23.544***	***23.764***	***131.130***
Expenses - Revenue	***1.665***	***5.106***	***4.900***	***4.796***	***5.603***	***5.156***	***5.042***	***4.962***	***4.808***	***4.588***	***30.551***

Figure E-7: Projected Expenses for Option 1(f): New Digby-Saint John Ropax ($ millions)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Vessel											
Capital / Interest	16.000	12.000	12.000	12.000	13.388	13.388	13.388	13.388	13.388	13.388	89.650
Fuel	3.500	3.500	6.653	6.653	6.653	6.653	6.653	6.653	6.653	6.653	38.948
Crew	2.829	2.829	2.700	2.700	2.700	2.700	2.700	2.700	2.700	2.700	18.496
Maintenance	2.500	2.000	2.000	2.250	1.000	1.000	1.500	1.500	2.000	2.000	12.363
Lay-Up Costs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*25.329*	*20.829*	*23.853*	*24.103*	*24.241*	*24.241*	*25.741*	*24.741*	*25.241*	*25.241*	162.837
Terminal & Admin											
Labour	1.300	1.300	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	7.332
Maintenance	1.092	0.708	1.378	0.501	4.431	2.000	2.000	2.000	2.000	2.000	11.456
Administration	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	10.139
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*4.392*	*4.008*	*4.378*	*3.501*	*7.431*	*5.000*	*5.000*	*5.000*	*5.000*	*5.000*	32.305
Total Expenses	***29.721***	***24.837***	***28.231***	***27.604***	***31.672***	***29.241***	***29.741***	***29.741***	***30.241***	***30.241***	***195.142***
Revenue	***10.968***	***10.734***	***11.324***	***11.425***	***11.901***	***12.007***	***12.149***	***12.256***	***12.364***	***12.507***	***78.472***
Expenses - Revenue	***18.753***	***14.103***	***16.907***	***16.179***	***19.771***	***17.234***	***17.592***	***17.485***	***17.877***	***17.734***	***116.670***

**Figure E-8: Projected Expenses for Option 3(a):
Used Digby-Saint John Ropax (w/no Yarmouth Service)**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Vessel											
Capital / Interest	16.000	12.000	6.694	6.694	6.694	6.694	6.694	6.694	6.694	6.694	59.375
Fuel	4.130	6.542	6.542	6.542	6.542	6.542	6.542	6.542	6.542	6.542	41.806
Crew	2.829	2.829	2.829	2.829	2.829	2.829	2.829	2.829	2.829	2.829	19.121
Maintenance	2.500	2.000	2.000	2.000	2.250	2.250	2.500	2.500	2.750	2.750	15.551
Lay-Up Costs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*25.959*	*23.871*	*18.565*	*18.565*	*18.815*	*18.815*	*19.065*	*19.065*	*19.315*	*19.315*	139.232
Terminal & Admin											
Labour	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	8.787
Maintenance	1.092	0.708	1.378	0.501	4.431	2.000	2.000	2.000	2.000	2.000	11.456
Administration	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	10.139
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*4.392*	*4.008*	*4.678*	*3.801*	*7.731*	*5.300*	*5.300*	*5.300*	*5.300*	*5.300*	33.760
Total Expenses	***30.531***	***27.879***	***23.243***	***22.366***	***26.546***	***24.115***	***24.365***	***24.365***	***24.615***	***24.615***	***172.992***
Revenue	***11.053***	***11.941***	***12.543***	***12.656***	***12.807***	***12.920***	***13.071***	***13.187***	***13.304***	***13.547***	***84.650***
Expenses - Revenue	***19.298***	***15.938***	***10.700***	***9.710***	***13.739***	***11.195***	***11.294***	***11.178***	***11.311***	***11.068***	***88.342***

**Figure E-9: Projected Expenses for Option 3(b):
New Digby-Saint John Ropax (w/no Yarmouth Service)**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	PV
Vessel											
Capital / Interest	16.000	12.000	12.000	12.000	13.388	13.388	13.388	13.388	13.388	13.388	89.650
Fuel	4.130	6.542	6.542	6.542	6.542	6.542	6.542	6.542	6.542	6.542	41.806
Crew	2.829	2.829	2.829	2.829	2.700	2.700	2.700	2.700	2.700	2.700	18.699
Maintenance	2.500	2.000	2.000	2.000	1.000	1.000	1.500	1.500	1.750	1.750	11.953
Lay-Up Costs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*25.959*	*23.871*	*23.871*	*23.871*	*24.130*	*24.130*	*24.630*	*24.630*	*24.880*	*24.880*	165.487
Terminal & Admin											
Labour	1.300	1.300	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	7.332
Maintenance	1.092	0.708	1.378	0.501	4.431	2.000	2.000	2.000	2.000	2.000	11.456
Administration	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	1.500	10.139
Other	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	3.380
Subtotal	*4.392*	*4.008*	*4.378*	*3.501*	*7.431*	*5.000*	*5.000*	*5.000*	*5.000*	*5.000*	32.305
Total Expenses	***30.351***	***27.879***	***28.249***	***27.372***	***31.561***	***29.130***	***29.630***	***29.630***	***29.880***	***29.880***	***197.792***
Revenue	***11.053***	***11.941***	***12.544***	***12.657***	***13.171***	***13.290***	***13.445***	***13.565***	***13.686***	***13.842***	***85.838***
Expenses - Revenue	***19.298***	***15.938***	***15.705***	***14.715***	***18.390***	***15.840***	***16.185***	***16.065***	***16.194***	***16.038***	***111.954***