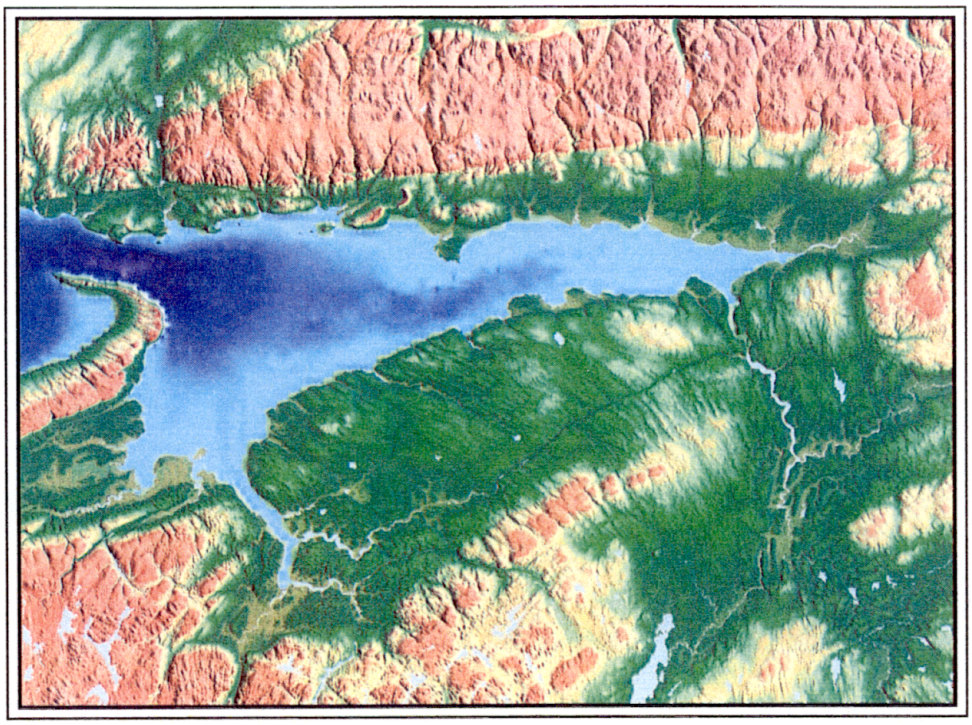
Minas Basin Watershed Profile



Robin Willcocks-Musselman

2003

Bay of Fundy Ecosystem Partnership Technical Report #2

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ACKNOWLEDGEMENTS

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Additional information of BoFEP and its working groups can be obtained from:

Bay of Fundy Ecosystem Partnership
Acadia Centre for Estuarine Research
Acadia University
Box 115
Wolfville, NS
B0P 1X0
Phone: 902-585-1113

and
The BoFEP website
http://www.auracom.com/~bofep

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EXECUTIVE SUMMARY

This profile is not a state of environment report for the Minas Basin watershed, rather a compendium of socio-economic information, land use, and water activity. It is intended to be an evolving reference document, where information can be added in the future so that trends can be easily monitored.

Due to time and financial limitations it was difficult to complete a comprehensive profile for the Minas Bain watershed. Furthermore, it is difficult to complete a watershed study when political boundaries, by which most data is compiled, do not follow watershed boundaries. Often the profile does therefore not accurately reflect the activities occurring in the watershed.

What the profile is able to illustrate, however, is that the Minas Basin watershed is a key area of Nova Scotia. Centrally located in the province, it is comprised of approximately 16.5% of the land area of Nova Scotia and carries close to the same percent of population: 17.8% of Nova Scotia's population or 161,950 people. There are 7 counties, 8 incorporated towns, 4 villages and 4 first nations reserves in the watershed. It is primarily of a rural landscape dotted with denser populations in small to medium sized urban centres and has a high ratio of private land ownership. The population of the watershed has shown little change over the last decade except for some specific areas such as Kings County, which has experienced continued growth.

Although there tends to be a high recognition of its uniqueness and importance to wildlife, very little land and marine environment is protected. The economy of the watershed has traditionally relied on primary resource activities such as agriculture, forestry, mining and fishing. Agriculture areas in Kings County and near Truro lead the province in livestock (chicken, pigs, cattle, bees), tree fruits, and vegetable production. Much of the watershed is covered in forests and a high percentage is privately owned in smallholdings. Harvest is primarily for softwood since the forests in the region are dominated by softwood species. Colchester County, which lies almost entirely in the watershed, leads the province in total forest production. Mining activity in the watershed is primarily for industrial minerals such as aggregates, gypsum and peat. The Minas Basin itself is a dynamic environment due to its extreme tidal environment and high siltation. Until recently, these factors have worked to provide a natural control of marine harvesting. Higher-powered fishing vessels and a continual input of pollution from the surrounding landscape has greatly affected the fishery in the Minas Basin. Fewer local fishermen and vessels are operating in the Basin. There has been increased focus on the harvesting of molluscs and crustaceans such as clams, lobsters and most recently baitworms. The recreational fishery has also suffered from the polluted rivers in the Minas Basin watershed. In particular, the inner Bay of Fundy salmon have declined substantially in recent years.

Manufacturing is becoming increasingly important to the economy of the watershed. It is one of the top employers along with Industry and the Retail Trade in the watershed. Many manufacturers support traditional resource industries (agriculture and forestry)

such as food processing companies and saw mills. Along with increased manufacturing, tourism is becoming increasingly important in the watershed. Both the Minas Basin and the Bay of Fundy are becoming sought after nature and ecotourism destinations. With this emphasis will come an increased importance in protecting and preserving its natural features. There are many signs of increased care of the impacts of humans on the natural environment including the improvement and upgrading of wastewater facilities and the provincial initiative to close of landfills within the watershed.

This profile was able to paint a general picture of the resources, activities and land uses in the Minas Basin watershed as well as some general trends. There are many more topics that could be investigated but perhaps the next step should be a more thorough investigation of the state of the resources and the effects the activities are having in the watershed.

1.0 INTRODUCTION

This profile is not meant to be a state of environment report for the Minas Basin watershed, rather a compendium of socio-economic information including population, demographics, labour force statistics, and land use and water activity in the Minas Basin watershed. It is intended to be an evolving reference document where future information can be added when available, so trends can be monitored.

It is difficult to compile an accurate profile of a watershed area when census zones often do not follow watershed boundaries. Every effort has been taken to get as accurate a profile as possible. For population and labour force information, a special profile was created by Statistics Canada using enumerations areas, the smallest data set available, to follow the watershed boundary as closely as possible. Agriculture and forestry information is not available for enumeration areas, but for county. The data gathered for these areas therefore does not accurately reflect activity in the Minas Basin watershed. This must be taken into account when analysing the data.

2.0 LOCATION

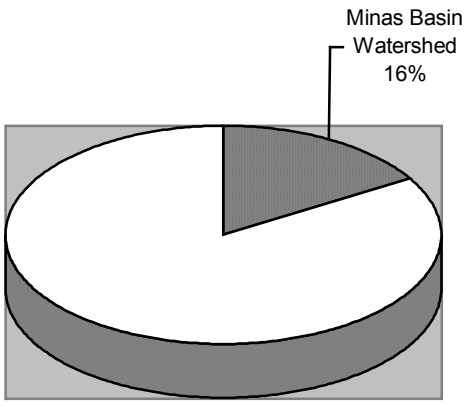
The Minas Basin watershed is located in the central region of Nova Scotia (See Map 1). It is comprised of the Minas Basin and several major watersheds surrounding it including the Cornwallis River watershed in Kings County, the Avon River watershed in Hants County, the Shubenacadie River watershed in Hants and Colchester Counties, and the Salmon River watershed in Colchester County. It also includes smaller watersheds in the North Shore of the Minas Basin including the Parrsboro area, and the South Shore of the Minas Basin around Noel in Hants County. The entire watershed including the Minas Basin is approximately 10,700 sq km* (land and ocean area). See Map 2 for a detailed image of the Minas Basin watershed.

These watersheds drain directly into the Minas Basin. The Minas Basin is southern branch of the Upper Bay of Fundy and was formed by rivers eroding eastward from the Bay of Fundy. It is comprised of four distinct parts: The Minas Channel, Central Minas Basin, The Southern Bight and Cobequid Bay (Percy, 2001) (See Map 3 for an illustration). The total area of the Minas Basin is approximately 1,150 sq km*/115,000 hectares (including estuaries) and combined with the Minas Channel, it is approximately 2,000 sq km*/190,000 hectares. The area of the Minas Basin fluctuates with the tides as the waterline can recede as much as 5km seaward exposing almost 15,400 sq km of intertidal zone (sand and mud flats and salt marsh) or approximately one third of the water covered area (Percy, 2001). Most of the Minas Basin is less than 25 metres deep at low tide, with an average depth of 14.5 metres (Percy, 2001). The Minas Channel typically has steeper, rockier sides and is much deeper, with a central trough of 100 metres in depth (Bousfield and Leim, 1958). The length of coastline of the Minas Basin, including the Minas Channel is approximately 875.0 km* (See Map 4).

Four counties directly border the Minas Basin, but the watershed has portions of 7 counties within it. These counties are: Colchester, Cumberland, Hants, Halifax, Kings, Lunenburg and Pictou (See Map 5). The watershed (excluding the Minas Basin) is

approximately 8,700 sq km/869,770 hectares*, almost six times larger than the Minas Basin itself. The Minas Basin watershed is therefore approximately 16.5% of the total land area of Nova Scotia (52,840 sq km/5,282,605 hectares). * *approximate values calculated by Jennifer Hackett, DFO Coastal and Oceans Management Division, 2001/2002*

Figure 1
Area of Minas Basin watershed as Percentage of Nova Scotia



Source: (Jennifer Hackett, DFO Coastal and Oceans Management Division 2002; Statistics Canada, March 1999)

3.0 GOVERNMENT STRUCTURE

All levels of government including federal, provincial, municipal and local (town), have jurisdictions within the Minas Basin watershed. As previously mentioned, there are seven counties within the Minas Basin watershed. Within these counties there are municipalities, towns and villages as defined by the Provincial Government. See Table 1 and Map 5 for locations of these Municipalities, Towns and Villages.

Each of the Counties in the watershed, have only portions of their entirety within the watershed. Table 2 summarizes the area of each county in the Minas Basin watershed. Hants and Colchester have the highest percentage of land in the watershed and Lunenburg and Pictou the lowest percentage, with very little land in the watershed.

Table 2 and Figure 2 show the county composition of the Minas Basin watershed. Lunenburg and Pictou Counties have such small amounts of area in the Minas Basin watershed that data will not be collected for them.

Table 1
Counties, Municipalities, Towns and Villages in the Minas Basin watershed

County	Municipality	Incorporated Towns	Villages
Colchester	Municipality of the County of Colchester	Stewiacke Truro	Bible Hill
Cumberland	Municipality of the County of Cumberland	Parrsboro	
Halifax	Halifax Regional Municipality (established April 1996)		
Hants	Municipality of the District of East Hants Municipality of the District of West Hants	Hantsport Windsor	
Kings	Municipality of the County of Kings	Berwick Kentville Wolfville	Canning New Minas Port Williams
Lunenburg	Municipality of District of Chester		
Pictou	Municipality of the County of Pictou		

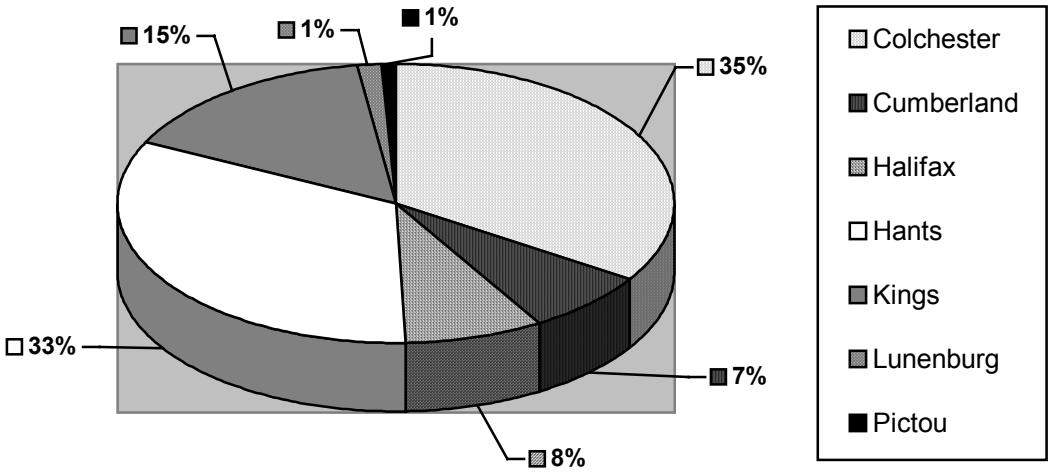
Source: (Service Nova Scotia and Municipal Relations, 2000)

Table 2
Area of Each County in the Minas Basin watershed

County	Area of Entire County (km2)	Area of County in Watershed* (km2)	% County in Minas Basin Watershed
Colchester	3,622.33	3,000	83%
Cumberland	4,288.18	620	14%
Halifax	5,557.00	700	12%
Hants	3,054.74	2,875	94%
Kings	2,182.24	1,355	62%
Lunenburg	2,880.44	130	4%
Pictou	2,774.42	70	2.5%

** Approximate values – calculated by Jennifer Hackett, DFO Coastal and Oceans Management Division*
Source: (Statistics Canada, March 1999)

Figure 2
County Composition of Minas Basin watershed



Source: (Jennifer Hackett, DFO Coastal and Oceans Management Division 2002; Statistics Canada, March 1999)

4.0 SOCIO-ECONOMIC PROFILE

Population and Labour Force information for the Minas Basin watershed was obtained by creating a special profile through Statistics Canada using enumeration areas and 1996 Census data. Enumeration areas are the smallest data set available, so this is the most accurate profile of the watershed possible. There are 269 enumeration areas that were used in the calculations of the statistical profile for the Minas Basin watershed. Enumeration areas were chosen to follow the watershed boundary as closely as possible, however many enumeration areas were bisected by the watershed boundary, so the author made personal decisions in deciding which areas to include and those to exclude. Map 6 shows the boundary created by the enumeration areas that were included in the calculations for the profile in comparison to the Minas Basin watershed boundary.

4.1 POPULATION CHARACTERISTICS

4.1.1 Population

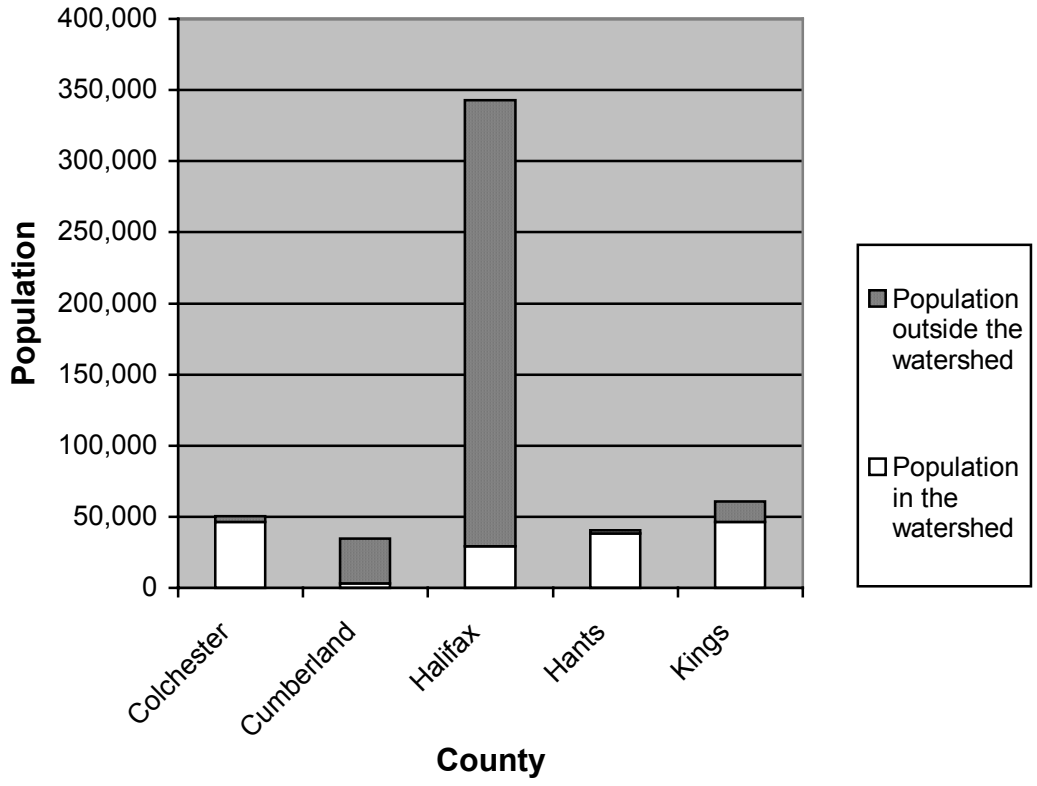
In 1996 the total population of Nova Scotia was 909,282, and the population of the Minas Basin watershed was 161,950. This accounts for 17.8% of the population of Nova Scotia. Table 3 and Figure 3 indicate the total population of each county in the watershed. Figure 3 also shows the approximate populations of each county in the watershed.

Table 3
Population of Counties in the Minas Basin watershed (1996)

County	Total population of County 1996	Population of county in Watershed 1996*	% Of population in Minas Basin watershed*
Colchester	50,432	46,243	91%
Cumberland	34,552	3,287	9.5%
Halifax	342,966	29,065	8.5%
Hants	40,440	38,220	94%
Kings	60,661	46,333	76%

** Approximate values calculated by author from 1996 enumeration area data provided by Statistics Canada – may not be totally accurate as data was missing for a few enumeration areas.*
Source: Source: (Statistics Canada, March 1999)

Figure 3
Population of Counties in the Minas Basin watershed (1996)



Source: (Statistics Canada, March 1999)

4.1.2 Population Change

Results from the 2001 Census show that population growth in Nova Scotia was only 1% since 1991. This is a low growth rate compared to the national rate of 5.7%. Kings County exhibited the strongest growth rate in all of Nova Scotia with an increase of 9.6% from 1991. Since 1976, the population of Kings County has increased by 12,000 people. Most of this new growth has been accommodated within the growth centre zones (KCED, 2001). Table 4 and Figure 4 show population change information for counties, towns and first nations in the watershed.

In Nova Scotia, only 5 of 18 Counties saw growth since 1991 and they were all located in the central area of the Province. These Counties included Kings, Hants, Halifax, Colchester and Antigonish. All except Antigonish have portions within the Minas Basin watershed. The concentration of growth in the central region of the province is largely driven by economics. People are moving closer to the economic hub of Halifax Metro because of the relatively high levels of employment (Nova Scotia Department of Finance, April 1997).

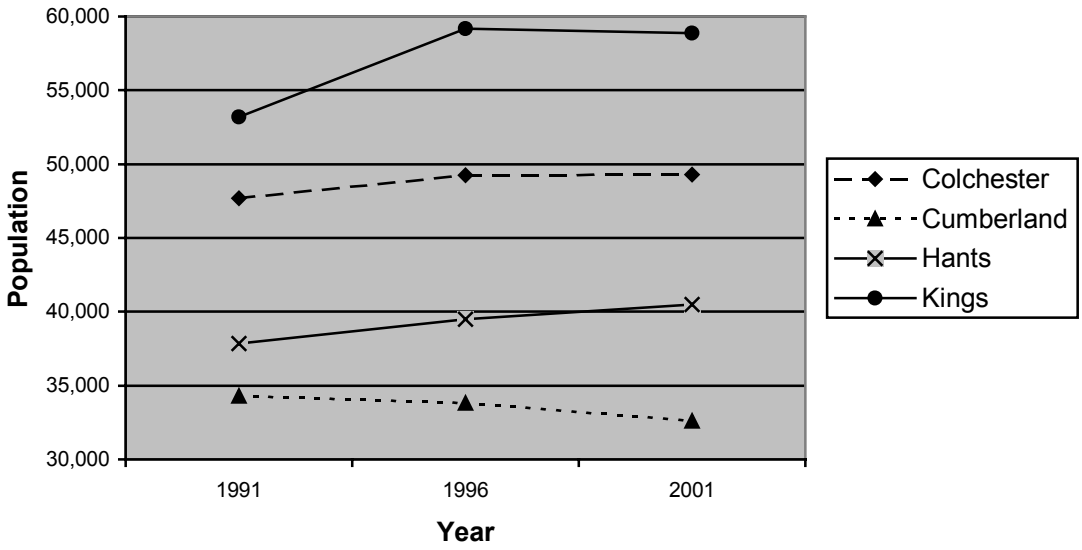
Within Kings County, the towns of Wolfville and Berwick exhibited the largest growth rates of 5% each. The Town of Stewiacke in Colchester County also had a large increase in population as well as all the First Nations Reserves in the watershed. Other towns in the watershed showing growth were Windsor and Kentville. Significant declines in population were seen in Hantsport and Parrsboro.

Table 4
Population Change of Counties and Towns in the Minas Basin watershed (1991-2001)

Geographic Location	1991	1996	2001	% Change 1991-2001
Nova Scotia	899,942	909,282	908,007	+1%
Minas Basin Watershed	n\a	161,950	n/a	n/a
Colchester County	47,683	49,262	49,307	+3%
Millbrook	601	758	821	+27%
Stewiacke	1,634	1,617	1,529	+5%
Truro	11,683	11,938	11,457	-2%
Cumberland County	34,284	33,804	32,605	-5%
Parrsboro	1,634	1,617	1,529	-6.8%
Halifax	*	342,966	359,183	+4.5% (from 1996-2001
Hants County	37,843	39,483	40,513	+6.5%
Hantsport	1,274	1,252	1,202	-6%
Indian Brook	773	946	932	+17%
Windsor	3,625	3,726	3,778	+4%
Kings County	53,193	59,193	58,866	+9.6%
Berwick	2,158	80	104	+29%
Cambridge/Annapolis	73	2,195	2,282	+5%
Horton/Glooscap	18	48	53	+66%
Kentville	5,506	5,551	5,610	+1.8%
Wolfville	3,475	3,833	3,658	+5%

** No 1991 data available because was before amalgamation of the Halifax Regional Municipality*
Source: (Statistics Canada, 1997; Statistics Canada, March 1999)

Figure 4
Population Change in the Counties of the Minas Basin watershed (1991-2001)

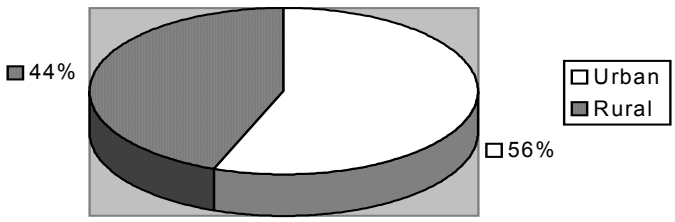


Source: (Statistics Canada, March 1999)

4.1.3 Urban and Rural Populations

The ratio of urban to rural population in Nova Scotia is 44:56 (See Figure 5). This ratio would likely vary in the Minas Basin watershed where there is a substantially greater rural population and absence of any large urban centres in the watershed. The largest town in the watershed is Truro with a population of 11,000 people. Table 5 and Figure 6 detail urban and rural populations of Counties of the watershed. Although the urban centres do contribute to growth, it is their urban peripheries that tend to be growing the fastest. This phenomenon seems typical of many urban areas. The population of the Truro agglomeration for example, increased by 2,500 from 1986 to 1991. The town of Truro however, lost 441 residents while its urban periphery, including the rural outskirts showed a net gain of 2,887 residents (The Canadian Institute for Research on Regional Development, 1997).

Figure 5
Urban – Rural Population of Nova Scotia (2001)



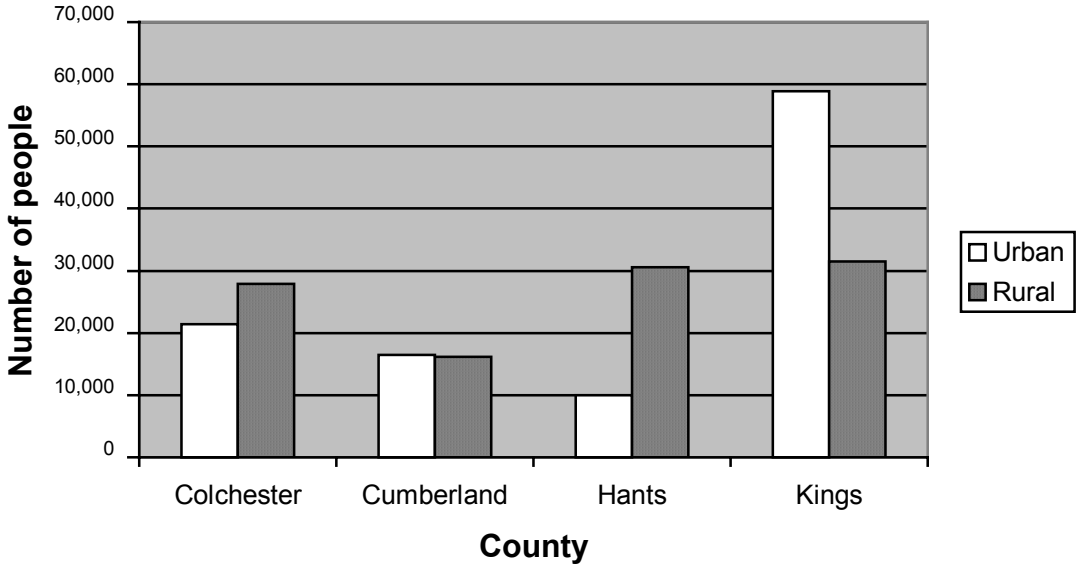
Source: (Statistics Canada, 2002)

Table 5
Urban/Rural Populations for Counties in Minas Basin watershed (2001)

Geographic Location	Total Population 2001	Urban Population Total	Urban Population % of Total	Rural Population Total	Rural Population % of Total
Nova Scotia	908,007	507,009	55.8%	400,998	44.2%
Minas Basin Watershed	n/a	n/a	n/a	n/a	n/a
Counties					
Colchester	49,307	21,442	43.5%	27,865	56.5%
Cumberland	32,605	16,454	50.5%	16,151	49.5%
Halifax	359,183	283,337	78.9%	75,846	21.1%
Hants	40,513	9,965	24.6%	30,548	75.4%
Kings	58,866	58,866	46.6%	31,450	53.4%
Towns *%100 Urban including Millbrook*		31,725	100%		
First Nations Reserves *%100 rural except Millbrook*				1,089	100%

Source: (Statistics Canada, 2002)

Figure 6
Urban/Rural Populations for Counties in the Minas Basin watershed (2001)



Note: Nova Scotia has a ratio of urban: rural population of 44:56
Halifax County has a ratio of urban: rural population of 79:21

Source: (Statistics Canada, 2002)

4.1.4 Population Density

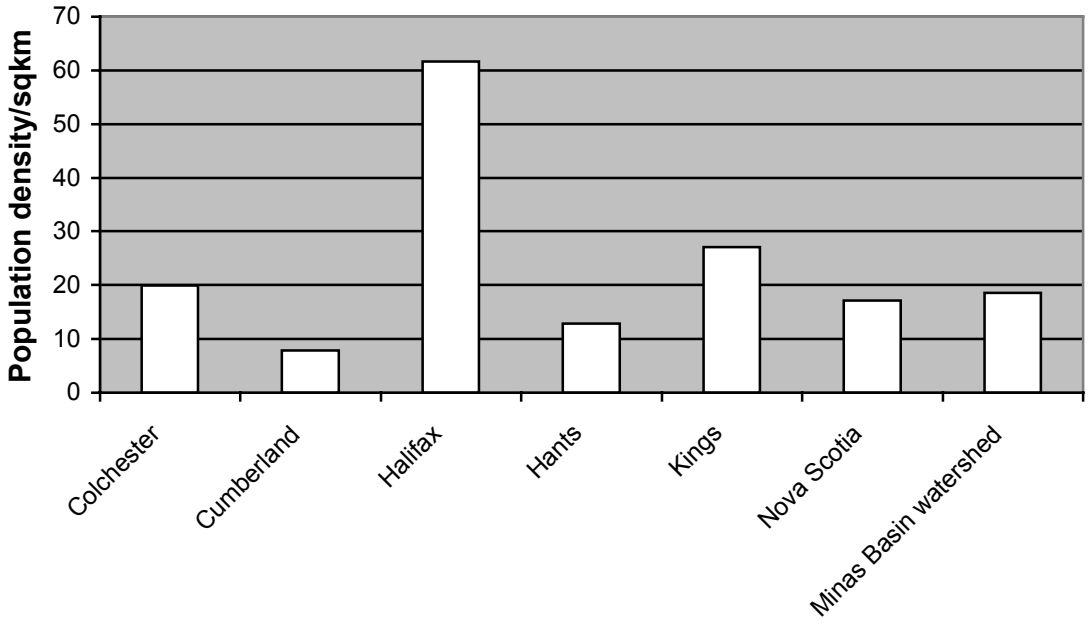
Kings County has the greatest population density of all Counties (Halifax not included) in the Minas Basin watershed and Cumberland has the lowest population. Table 6 and Figure 7 summarize population densities for Counties and Towns in the watershed. Within the watershed, populations are typically concentrated around the major towns, along the major highways and in the coastal areas (See Map 7).

Table 6
Population Density in the Minas Basin watershed (1996)

Geographic Area	Area Km2	Population (1996)	Population Density/km2 (1996)	# Private Dwellings
Nova Scotia	52,840.83	909,282	17.2	344,779
Minas Basin Watershed	8,700	161,950	18.6	58,745
Counties				
Colchester	2,472.91	49,262	19.9	18,900
Cumberland	4,288.18	33,804	7.9	13,310
Halifax	5,557.00	342,966	61.7	132,670
Hants	3,054.74	39,483	12.9	14,065
Kings	2,182.24	59,193	27.1	21,975
Towns				
Berwick	5.87	2,195	373.9	825
Hantsport	1.94	1,252	645.4	505
Kentville	17.12	5,551	324.2	2,295
Parrsboro	13.70	1,617	118.0	695
Stewiacke	18.82	1,405	74.6	520
Truro	36.09	11,938	330.8	5,340
Windsor	9.01	3,726	413.5	1,475
Wolfville	7.31	3,833	524.3	1,660
First Nations				
Cambridge/Annapolis	0.15	80	533.3	35
Horton/Glooscap	1.66	48	28.9	20
Millbrook	3.56	758	212.9	225
Indian Brook	11.85	946	79.8	255

Source: (Statistics Canada, 1999)

Figure 7
Population Density of Minas Basin watershed Counties (1996)



Source: (Statistics Canada, 1999)

4.1.5 Age of Population

Data from the 1996 Census shows the population of Nova Scotia is aging. The population over 35 years of age is increasing (by 53.8%), and decreasing in the under 35-age group (-8.9%) (Nova Scotia Department of Finance, August 1997). Since no data for 1991 was available for the watershed, it is difficult to see if this trend is similar in the watershed.

The senior population (over 65) in Nova Scotia has been increasing over the last 25 years. In 1971 only 9.2% of Nova Scotia was over the age of 65, and in 1996 that percentage increased to 13%. This is the highest percentage of seniors in Atlantic Canada and the third highest in Canada. This trend is evident in all provinces as illustrated in the national level rising from 8.1% in 1971 to 12.2% in 1996 (Nova Scotia Department of Finance, August 1997).

The data indicates the age distribution in the watershed is similar to that of the province with the exception of the 45-65 year age group, which is substantially higher in the watershed. The largest population increase in Nova Scotia since 1991 for any age group was a 28.4% increase in the population of middle-aged (45-49 years olds). The greatest decrease in population was a 20% drop in the young adult group (25-29 year olds) (Nova Scotia Department of Finance, August 1997).

Declining populations in Nova Scotia were also visible in the preschool (under 5 years of age). This group has declined by 19.8% since 1971. This trend runs parallel to declining birth rates and family sizes that have been evident over the last 25 years. The primary aged

school population is dropping as well, with a 27.4% decline since 1971. The working age population of Nova Scotia (20-63) has increased slightly since 1991, most occurring in the senior workers (45-64). However, since 68% of the working age population is in the junior age group (20-44) (this is similar to the Minas Basin watershed), this will likely result in a high concentration of the most productive age groups in the labour force for the next decade (Nova Scotia Department of Finance, August 1997).

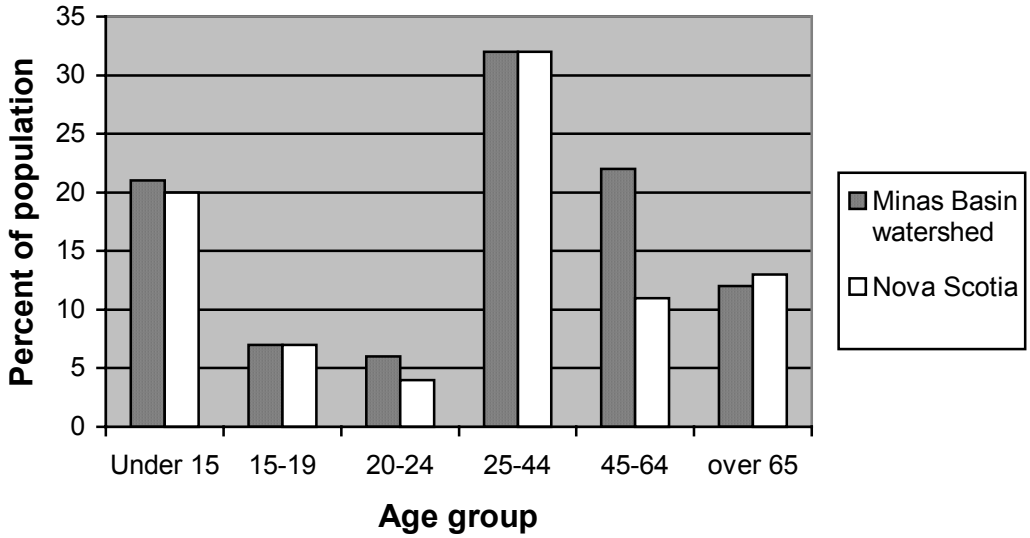
Population data by age group specifically for the Minas Basin watershed is summarized in Table 7 and Figure 8.

Table 7
Population of Minas Basin watershed by Age (1996)

Age Group	Minas Basin Watershed Total (1996)	% Total of Minas Basin Watershed	Nova Scotia Total (1996)	% Nova Scotia Total
Under 15 years	33,945	21%	180,115	20%
15 - 24 years				
15 - 19 years	11,565	7%	62,015	7%
20 - 24 years	10,480	6%	34,655	4%
25 - 44 years	51,140	32%	287,465	32%
45 - 64 years	35,500	22%	100,295	11%
65 years and older	19,245	12%	119,115	13%
15 years and older **	128,020	79%	729,175	80%

** *The working age population*
Source: (Statistics Canada, 1997)

Figure 8
Percent of Population by Age for Minas Basin watershed and Nova Scotia (1996)



Source: (Statistics Canada, 1997)

4.1.6 Aboriginal Population

There are six Indian Reservations in the Minas Basin watershed. They are: Cambridge/Annapolis; Glooscap; St. Croix; Millbrook; Indian Brook; Shubenacadie (See Map 5). The 1996 Census was the first time Aboriginal populations included individuals who are not Treaty or Registered Indians. Registered Indians are those who are registered under the Indian Act of Canada. Treaty Indians are persons who are registered under the Indian Act and can prove they are descended from a band that signed a treaty (Nova Scotia Department of Finance, January 1998).

The Aboriginal population of Nova Scotia includes North American Indians, Inuits and Metis. Based on 20% sample data, the total number of Aboriginal people living in the Minas Basin watershed is approximately 2,800. The number of Aboriginal peoples living on reservations is approximately 1,832, or 65% of the total Aboriginal population. Therefore, approximately 35% of Aboriginal peoples living in the Minas Basin watershed do not live on First Nations Reserves.

The Aboriginal population comprises approximately 2% of the Minas Basin watershed population, where the Aboriginal population of Nova Scotia was 1.4% of the total. In comparison, the national Aboriginal population in 1996 was approximately 3% of total population (Nova Scotia Department of Finance, January 1998).

4.1.7 Immigration

Nova Scotia has one of the lowest numbers of immigrants in Canada: 41,955 people or 4.7%. Only Newfoundland, PEI and New Brunswick have a lower percentage than this. This is an increase of 7.4% since 1991. Table 8 and Figure 9 illustrate a similar percentage of immigrant population in the Minas Basin watershed (4%). Most immigrants to Nova Scotia reside in the Halifax Metropolitan area (56.5%). They represent 7.3% of the total population of Metro (Nova Scotia Department of Finance, November 1997).

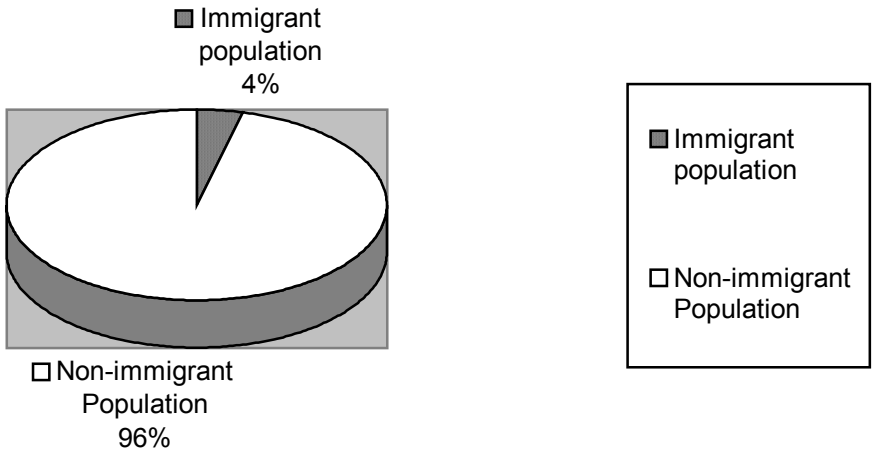
Approximately 30% of the immigrants to Nova Scotia come from the United Kingdom, followed by 21% form the United States, 5.7% from Germany and 4.9% from Netherlands. Immigrants from the Middle East account for 5.6% and those from the Far East represent 4.2% of the total. In the most recent 5 year period, a change in the overall total was shown as 12.9% of immigrants came from the United States followed by 8% from Kuwait, 5.9% from the United Kingdom, 5.7% from both China and India and 5.1% from Egypt (Nova Scotia Department of Finance, November 1997).

Table 8
Immigration in the Minas Basin watershed (1996)

	Population
Total population by place of birth (20% sample data)	158,435
Non immigrant population	152,040
Born in province of residence	126,540
Total immigrant population (from other countries)	5,925
Non permanent residents	345

Source: (Statistics Canada, 1997)

Figure 9
Immigrant Population in the Minas Basin watershed (1996)



Source: (Statistics Canada, 1997)

4.2 LABOUR FORCE CHARACTERISTICS

4.2.1 Labour Force Activity

In 1996 there were 126,350 people over fifteen years of age in the Minas Basin watershed. The number of people employed or looking for work (the labour force) was 80,160. Another 46,060 were not in the labour force, resulting in a participation rate of 59.7%. This was just under the provincial rate of 61%. Males made up 55% of the labour force in the Minas Basin watershed and women 45%. There were 71,045 employed and 9,040 unemployed resulting in an unemployment rate of 15.09% in the watershed, slightly higher than the provincial average of 13.3%, and the national average of 10.1% (Nova Scotia Department of Finance, May 1998). Table 9 summarizes labour force activity for the Minas Basin watershed.

Counties in the Minas Basin watershed had some of the provinces lowest unemployment rates at: Colchester (12.1%); Cumberland (16.3%); Hants (12.6%); and Kings (11.0%). In comparison, Nova Scotia's highest unemployment rates were found in Cape Breton County

(22.7%), Victoria County (38.4%), Richmond County (27.9%), and Inverness County (23.4%). The lowest unemployment rate was found in Halifax County (8.7%) (Nova Scotia Department of Finance, May 1998).

Table 9
Labour Force Activity for Population 15+ in the Minas Basin watershed (1996)

Labour Force	*Minas Basin watershed (1996)*	*Nova Scotia (1996)*
Population In labour force	80,160	438,950
Employed	71,045	380,785
Unemployed	9,040	58,185
Not in labour force	46,060	281,000
Participation rate (%)	59.70 %	61%
Employment – population ratio	51.62	
Unemployment rate (%)	15.09 %	13.3%
Total Population 15+ (sample size)	**126,350**	**719,970**

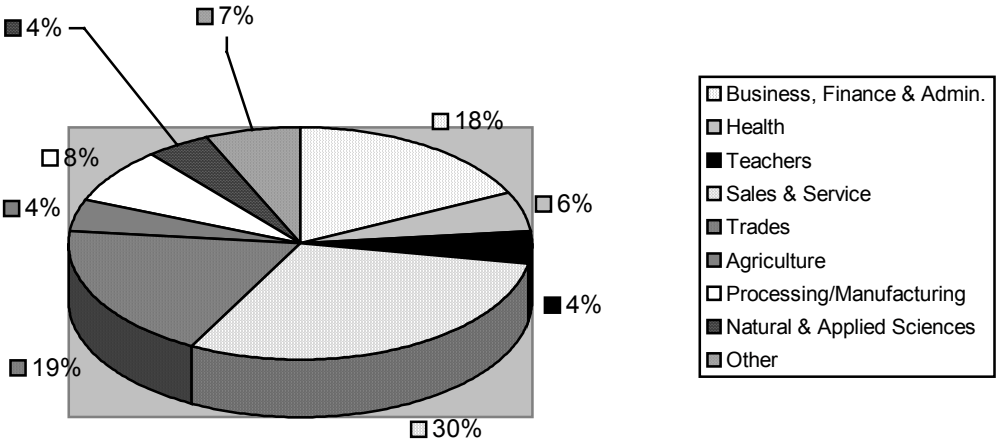
(based on 20% sample data
Source: (Statistics Canada, 1997)

4.2.2 Occupation

Occupation data is calculated using experienced labour force. An experienced worker is defined as someone fifteen and older who worked for any or all of the period between January 1, 1996 and the week before census day (May 14, 1996).

The top five occupation groupings in Nova Scotia were; Sales and Service (28.8%); Business, finance and administration (16.6%); Trades, transportation and equipment operation (14.9%); Management (8.4%); Science, education, government service and religion (6.7%) (Nova Scotia Department of Finance, May 1998). In the Minas Basin watershed, three of the top five occupation groupings were similar to provincial: Sales and Service (27%); Trades, transportation and equipment operation (17%); Business, Finance and Administration (16%). Processing and Manufacturing (7%); and Health (5%); Natural and Applied Sciences and related occupations (4%); Teachers and professors (4%); and Agriculture (4%) are all similar in labour force employment. Figure 10 and Table 10 illustrate these figures.

Figure 10
Employed Labour Force by Occupation in the Minas Basin Watershed



Source: (Statistics Canada, 1997)

Table 10
Employed Labour Force by Occupation in the Minas Basin watershed (1996)

Occupation	*Number Employed In 1996*	*% of 1996 Total*
Paralegals, Social Services Workers	485	
Management	680	
Forestry and Mining Operations	980	1%
Primary Production labourers	1,165	1%
Judges, Lawyers, Psychologists, Social Workers…	1,385	2%
Art, Culture, Recreation and Sport	1,420	2%
Teachers and Professors	2,910	4%
Natural and Applied Sciences and related Occupations	2,955	4%
Agriculture	3,430	4%
Health	3,730	5%
Processing and Manufacturing	5,495	7%
Business, Finance and Administration	12,465*	16%
Trades, Transport and Equipment Operators…	13,450	17%
Sales and Service	20,870	27%
Total Labour Force	**78,150**	**100%**

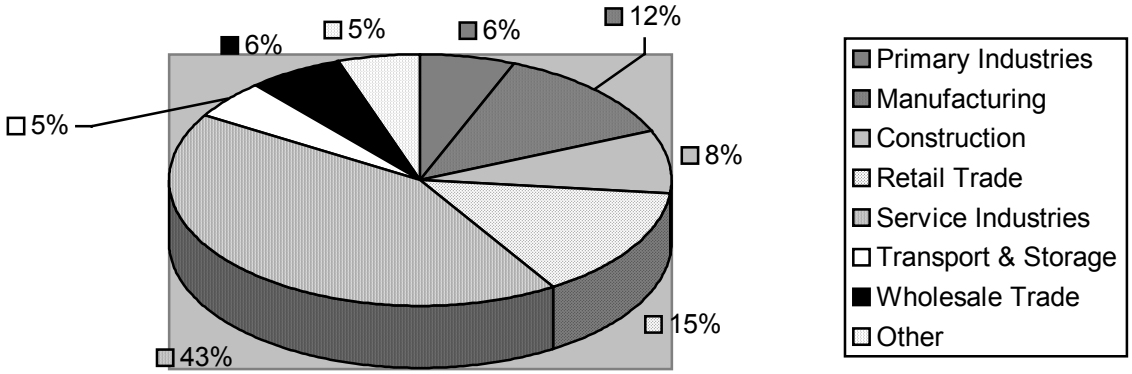
**majority of these workers are clerical occupations (7,130)*
Source: (Statistics Canada, 1997)

4.2.3 Industry

There are eighteen major industry groupings based on the 1980 Standard Industrial Classification. In Nova Scotia, the major employers by industry division are Retail Trade (13.5%), Health and Social services (11%), Manufacturing (10.7%), Government Services (9.9%) and Education Services (7.5%). In the Minas Basin watershed, the top

three largest employers by Industry division are also the top three for Nova Scotia; Retail Trade (14%); Manufacturing (13%); and Health and Social Services (10%). Figure 11 and Table 11 summarize this information.

Figure 11
Employed Labour Force by Industry in The Minas Basin watershed (1996)



Source: (Statistics Canada, 1997)

Table 11
Employed Labour Force by Industry in the Minas Basin watershed (1996)

Industry	*Number Employed in 1996*	*% of 1996 Total*
Fishing and Trapping Industries	240	
Mining (including millings, quarrying and	550	
Logging and Forestry Industries	1,005	1%
Real Estate Operator and Insurance Agencies	1,140	1%
Finance and Insurance Industries	1,905	2%
Communication and other Utility Industries	1,950	2%
Business Service Industries	2,665	3%
Transportation and Storage Industries	3,885	5%
Agricultural and related service industries	4,275	5%
Wholesale Trade Industries	4,470	6%
Accommodation, Food and Beverage Service Industries	4,630	6%
Educational Service Industries	5,245	7%
Other Service Industries	5,675	7%
Government Service Industries	5,915	8%
Construction Industries	6,005	8%
Health and Social Service Industries	7,530	10%
Manufacturing Industries	9,400	12%
Retail Trade Industries	10,855	14%
Total Labour Force	**78,095**	**100%**

based on 20% sample data
Source: (Statistics Canada, 1997)

For more information on specific industries in the Minas Basin Watershed, Table 12 lists major employers that have one hundred or more employees. Furthermore, APPENDIX A has a more extensive list of major employers in the Minas Basin watershed.

Table 12
Nova Scotia's Largest Employers with One Hundred or More Employees (1998)

Company	*#Employees (if available)*
Colchester County	
Canadian Automotive Radiator Exchange & Mgr. Ltd.	180-200
Canadian Tire Associate Store	
Chignecto-Central Regional School Board	
Children's Aid Society and Family Services	
Crossley Carpet Mills Limited	300-350
Glengarry Motel and Restaurant	
Hillcrest Manor	
Home Hardware Distribution Centre	200
Intertape Polymer Inc.	390
Kohler International Ltd.	150
MacQuarrie's Drugs	
Nova Scotia Agricultural College	
Cumberland County	
Oxford Frozen Foods	
Parrsboro Metal Fabricators Ltd.	
Hants County	
Avon Valley Greenhouses	
CKF Inc.	250
Dillman Enterprises Ltd.	
Dykeland Lodge	
Fundy Gypsum Company Ltd.	
Minas Basin Pulp and Power Co. Ltd.	165
National Gypsum Canada Ltd.	
Nova Scotia Textiles Ltd.	216
Scotia Investments Ltd.	
Ski Martock	
The Shaw Group Ltd.	60+
Windsor Elms	
Halifax County	
Air Nova	
Cara Operations Ltd.	
Litton Systems Canada Ltd.	150
Pratt & Whitney Canada	410
Kings County	
ACA Co-operative Ltd.	500
Acadia University	630

Company	***#Employees (if available)***
Annapolis Valley Regional School Board	2000
Avon Foods	150
Carey Brothers Masonry Ltd.	
Eastern Protein Foods	125
Grand View Manor	
Hostess Frito-Lay Company	232
Larsen Packers Ltd.	350-500
Michelin North America	1000
Old Orchard Inn Ltd.	
Sarsfield Foods Ltd.	150-175
Stirling Fruit Farms	450
The Maple Leaf Poultry Company – Shur Gain	260-340
Valley Regional Hospital	700
Weavexx	150
Webster Farms Ltd.	

Source: (Nova Scotia Department of Finance, January 1996)

4.2.4 Education

In general, the education level of people aged fifteen years or older in Nova Scotia has increased over the last forty-five years. Those with less than a grade nine education have fallen from 48.6% in 1951 to 11.5% in 1996 (Nova Scotia Department of Finance, May 1998). In the Minas Basin watershed only 10% of the population have less than a grade 9 education.

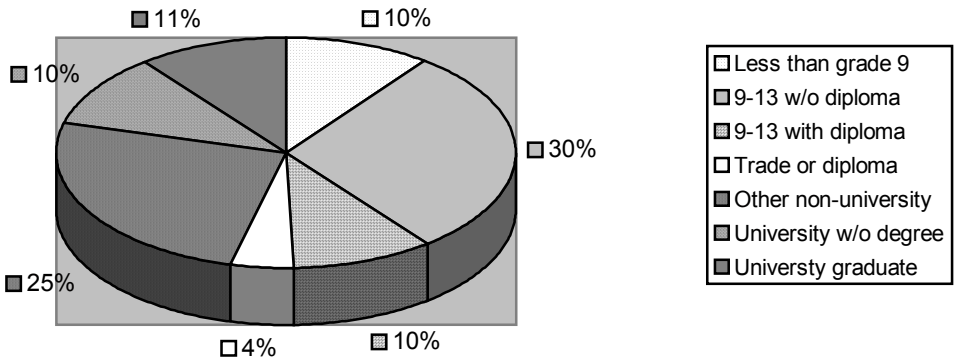
Provincially, the population with postsecondary education has increased from 1.3% in 1951 to 47.2% in 1996. In the Minas Basin watershed, 40% of the population has a post secondary education (trades certificate or diploma, other non-university education or a university degree). Furthermore, the female population has overtaken the male population for higher education in Nova Scotia. In 1996, 47.9% of all females had at least some level of postsecondary education compared to 46.4% of males (Nova Scotia Department of Finance, May 1998).

Table 13
Education Level of Population 15+ in the Minas Basin watershed (1996)

Education Level	***Number***	***% of 1996 Total***
Less than grade 9	12,790	10%
Grades 9-13, without secondary certificate or diploma	36,680	29%
Grades 9-13, with secondary certificate or diploma	12,745	10%
Trades certificate or diploma and	5,415	4%
Other non-university education	31,965	25%
University without degree	12,850	10%
University with degree (bachelors degree or higher)	13,320	11%
Total population	**126,325**	**100%**

Based on 20% sample data; Source: (Statistics Canada, 1997)

Figure 12
Education Level of Population 15+ in the Minas Basin watershed (1996)



Source: (Statistics Canada, 1997)

4.2.5 Income Distribution

In the Minas Basin watershed, 69% of the population have some source of income. This compares with 72% of Nova Scotia (Statistics Canada, 1999). Table 14 summarizes income distribution in the Minas Basin watershed.

Table 14
Income Distribution in Minas Basin watershed and Nova Scotia (1996)

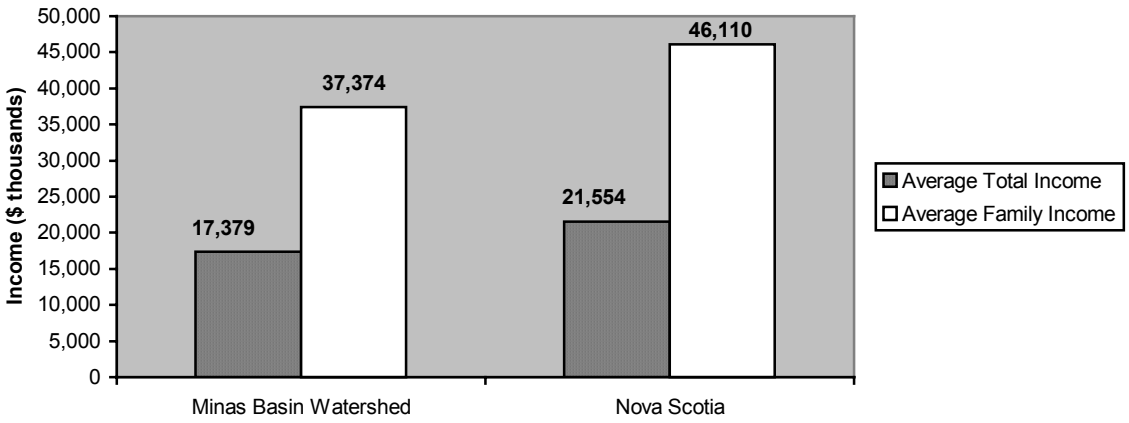
	Minas Basin Watershed	*Nova Scotia Total*
Total population 15+ With income	112,070*	661,905
Total population 15+ Without income	9,585	58,065
Total population 15+ With employment income	79,640+	456,714
Total population 15+ Without employment income	41,960	20,519

** Based on 20% sample data (121,690 total)*
+ Based on 20% sample data (121,700 total)
Source: (Statistics Canada, 1997; Statistics Canada, 1999)

4.2.6 Average Income

The average income in the Minas Basin watershed is $17,379.93. This is lower than the provincial average of $21,554. The average family income in the watershed is higher at $37,374.37 and compares to $46,110.00 for Nova Scotia. Figure 13 illustrates this information.

Figure 13
Average Incomes for Minas Basin watershed and Nova Scotia (1996)



** Based on 20% sample data/+ Based on Full-year, Full-time employment*
Source: (Statistics Canada, 1997; Statistics Canada, 1999)

5.0 RESOURCES

The Minas Basin and surrounding watershed is a truly unique environment. The area is rich in natural resources and has a variety of unique features including extreme tides, salt marshes, sandstone cliffs, tidal rivers, mudflats, fertile agricultural lands, wet forests, significant geology (fossils and semi precious gems), and a rich cultural history. These resources and features have shaped land use activities, settlements and the economy over time. In turn, human activity has affected the quality of the environment and the lives of the people who live there. Information about the natural environment in Nova Scotia is abundant and it is not the purpose of this paper to detail it, however, a brief overview of the Minas Basin region will help to provide some perspective on land use in the region.

The Nova Scotia Museum has divided Nova Scotia into eco-zones to more easily describe its natural environments. There are 5 primary ecodistricts represented in the Minas Basin watershed: The Avalon Highland; The Basalt Headlands; The Till Plain; The Valley and the Tidal Bay (See Map 8). *Information on these ecodistricts has been obtained from the Nova Scotia Museum of Natural History website and The Fundy Shore Ecotour website.*

Hardwood plateau (Cobequid Hills)
This eco-zone is part of the Avalon Uplands region. Typically, this area experiences more severe winters, greater precipitation and shorter growing seasons than surrounding lowlands. It is a steep sided highland located on the north side of the Minas Basin and extends from the tip of Cape Chignecto through northern Nova Scotia. The uplands are dominated by hardwood forests of Sugar Maple and Yellow Birch and pockets of softwoods such as Red Spruce can be found clinging to the steep slopes. There are also several interesting and rare plant species found here. The Avalon landscape is defined by

a fault running parallel to the Minas Basin for almost 100km. This is the Cobequid Hills, a cigar shaped form approximately 275 km high, 120 km long and 15 km wide. It delineates the resistant older rock to the north and the carboniferous lowlands to the south. These hills are the headwaters for many streams and rivers flowing into the Minas Basin. Lakes and bogs empty into streams and rivers that often lunge over the steep slopes creating gorges and several spectacular waterfalls, eight of which are as high as 30m.

The Basalt Headlands

The Basalt headlands are a chain of intermittent high-cliff bluffs and islands fringing the northern shore of the Minas Basin. They extend in a straight line from Economy Mountain to Cape d'Or and include Cape Blomidon to the south. This area has many striking, irregular geological formations created by the soft Triassic shorelines rapidly eroding and leaving the erosion-resistant basalt capped sections of the shoreline. Examples of this are Spencer's Island, Two Islands and Five Islands where it is easy to see the contrast between dark grey basalt lying on brick red Triassic sandstone. Large glacial outwash deposits are common on the Parrsboro Shore and coastal sediments form localized area of salt marsh, gravel beaches and mud flats.

The Valley

The most eastern portion of the Annapolis Valley lies within the Minas Basin watershed. The Valley is cradled by Basalt Mountains to the north and south, which have not eroded as quickly as the sandstone floor that has been carved out by river action and deepened by glacial scouring. Sandy soils and pine-barrens are unique to this area but primarily lie just west of the watershed. East of Kentville, the valley opens up creating a wide, fertile farming area dominated by five rivers: the Gaspereau, Cornwallis, Canard, Habitant and Pereaux. The floodplain of these rivers has been transformed by dyking into agricultural land by the early Acadian farmers. This region is an agricultural region due to its more protected climate and rich fluvial deposits.

Tidal Bay

This eco-zone includes the fringe shoreline surrounding Cobequid Bay and the southern edges of the Minas Basin. The area shares many of the Valleys scenic characteristics: it is a narrow and elongated farming region based originally on the dyking of tidal marshlands. Unlike the Valley, which is clearly defined by escarpments, this region rises gently to the slightly more elevated Carboniferous lowlands (east of Truro) that create a landscape of low rolling hills. Low tide exposes vast amounts of sand and mud creating intertidal areas up to 5 kms wide. The water temperature in this area is typically much warmer than the rest of the bay and it is home to the highest recorded tide in the world. The tidal range at Burntcoat head has reached 16.5m and at Economy Point it has had a range of 16.4m. The rivers in this area have tidal bores when the tide floods up river.

The Windsor Lowlands

This eco-zone covers a large area south of the Minas Basin between two major tidal rivers: the Shubenacadie to the east and the Avon to the west. It is characterized by large expanses of low rolling hills and ridges, interlaced with fertile river valleys. Glacial

deposits heavily cover this area, as much as 425m thick in some places. Deposits generally consist 50% of shales and 25% each of limestone and gypsum. White cliffs of gypsum can be seen from Windsor to Brooklyn. The rivers in this area are slow moving, mature floodplain rivers because the landscape has little relief. There are several tidal rivers including the Kennetcook, Avon and Shubenacadie. Low relief, poor drainage and repeated cutting and burning of forests have influenced the vegetation found in this area. Typically species that recolonize easily such pines and shrubs are found in these disturbed forest habitats.

5.1 CLIMATE

In general, Nova Scotia has a modified continental climate but distance from the coast and elevation determine local climate variations (Nova Scotia Department of Development, 1986). Nova Scotia is divided into eight broad climatic regions. Four climatic regions are represented in the Minas Basin watershed: The Bay of Fundy Region; The Annapolis Valley Region; The Eastern Nova Scotian Region and Northern Nova Scotia Region (See Map 9) (Nova Scotia Department of Development, 1986). The Bay of Fundy Region hugs the coastline around the Minas Basin and Minas Channel. A strong coastal influence produces a long cool summer and a mild winter. There is plenty of fog and moderate precipitation in this area (Nova Scotia Department of Development, 1986). In contrast, the Annapolis Valley region is sheltered lowland with the warmest temperatures and the second lowest precipitation in the province (Nova Scotia Department of Development, 1986). The Eastern Nova Scotia region is a diverse geographic area with high rainfall and generally cool temperatures influenced by the cool Labrador current, and the highlands above Parrsboro and Economy on the north shore of the Minas Basin fall into Northern Nova Scotia region and receive heavy snowfall and have the coldest winter temperatures but enjoy quite warm summers (Nova Scotia Department of Development, 1986). The growing seasons in the Minas Basin area vary from 200 days in the Valley area and 190 in the Truro area (Nova Scotia Department of Development, 1986).

5.2 CULTURE AND HERITAGE

Information for section 5.2 has been obtained from the Nova Scotia Museum of Natural History website, The Fundy Shore Ecotour website, Percy, 2001 and Nova Scotia Department of Development, 1986 unless otherwise indicated.

5.2.1 Native History

There are several first nation reserves in the watershed (see Table 4 and Map 5) and the area is rich in native history. Paleo-Indians migrated to Nova Scotia roughly 11,000 years ago, during the end of the last ice age. Evidence of their presence was discovered at an archaeological site near Debert. The eight-hectare Debert Site, which was known at the gathering place, is the only Paleo-Indian site found in the Province.

Mi'kmaq mythology is centred on the headlands of the Minas Basin. Glooscap, their most important legendary figure, was believed to have lived on Cape Blomidon. The basalt islands were said to be pieces of land he tore away and hurled into the Bay as a result of his battles with his adversaries. Mi'kmaq people migrated between Partridge

Island on the north shore of the Minas Basin and Blomidon on the south shore. It continued to be a vital crossing to the Acadian and British inhabitants who followed. In the 19th century, the Minas Basin was a highway, not an obstacle, and it was considered easier to go across to the Annapolis Valley than to travel by land to Amherst. At that time the Parrsboro shore was even part of Kings County, being connected by ferry with Kingsport and Wolfville. The last ferry, the Kipawo, stopped running in 1942.

Many parts of the Windsor Lowlands were also favourite spots of the Mi'kmaq for hunting and fishing and many of the place names in this area are of Mi'kmaq origin. Shubenacadie, south of Truro, has long been a Mi'kmaq settlement and remains one of the largest Mi'kmaq communities in the province.

5.2.2 Acadian Settlers

In the 1600's, the Acadians migrated up the Valley from Annapolis Royal and began to dyke the fertile salt marshes along the upper reaches of the Minas Basin. Their largest settlement in this area was at Grand Pre. Settlements also occurred as far-reaching as the St. Croix, Avon and Kennetcook Rivers. Thus, the coastline in these areas of the Minas Basin underwent radical changes as dyke building by the Acadians transformed these estuarine salt marshes into fertile agricultural lands. After the British deported the Acadians in 1755, British settlers continued to maintain the dyke lands for agriculture.

5.2.3 Timber Harvesting

Many of the first European Settlers made their homes amongst the heavily forested shores of the Minas Basin to farm and establish agricultural communities. They soon began to harvest the valuable timer resources that covered the watershed. This led to an explosion of logging and shipping. During the late 1800s, 192 water-powered sawmills operated within the confines of Cumberland County alone. In the northern Minas Basin, lumbering communities constructed pole railways to haul logs down the Cobequid slopes. Much of Hants County was also logged for its timber and many lumbering and sawmill operations are still found here. During the heyday of the lumbering industry, communities often tried to remove all the trees that surrounded their villages as a sign of prosperity. Each year, thousands of ships from the Bay of Fundy departed the shores of Nova Scotia carrying cargoes of lumber.

5.2.4 Shipbuilding and Shipping

Shipbuilding and shipping commanded the Minas Basin region's economy for most of the 19th century. The Parrsboro Shore was Canada's leading supplier of ships and seamen until the advent of steam. More than 400 wooden ships were built in these coastal communities such as Parrsboro and Port Greville during the Age of Sail. Maitland, across the Basin, was also a shipbuilding community with a total of 108 vessels registered there alone. Maitland is also the terminus of the Shubenacadie Canal that connects the Bay of Fundy with the Atlantic Ocean. It was built in the early 1800's by a consortium of Halifax merchants who were trying to reduce shipping costs. Often saleable goods from the regions were loaded on these boats and both ship and cargo would be sold at the destination. Evidence of the regions shipping heritage are the numerous lighthouses that used to dot the shores of the Minas Basin. Most are decommissioned now.

5.2.5 Fossils and Rock hounding

The shores of the Minas Basin are composed of red Triassic sandstone, which have been conducive to the preservation of Triassic fossils within the sandstone layers. These layers were deposited when the Bay of Fundy was an arid, hill-fringed basin; before the ocean flooded the Minas Basin. Fossil-bearing cliffs and rocks, where plants and dinosaur remains have been excavated are sites of immense interest to scientists and fossil enthusiasts. Rock hounds are also attracted by the presence of agates, jasper, chalcedony, zeolites and amethyst in coastal beaches of Parrsboro and Scots Bay. In 1607, Samuel de Champlain landed at Cape d'Or and Partridge Island where he apparently collected large fragments of amethyst.

5.3 FORESTS

Nova Scotia lies within the Acadian Forest Region. This region is represented only in the Maritimes. It is a meeting ground for temperate hardwoods from the south and boreal softwoods from the north. Major species found in these forests are fir, spruce, hemlock, oak, birch and Maple (Nova Scotia Department of Development, 1986).

Three quarters (10.2 million acres) of Nova Scotia's land mass is covered by forest of which almost 75% is softwoods (fir, spruce, pine, hemlock) and the remainder is hardwood (birch, Maple, oak) (Nova Scotia Department of Development, 1986). The percent of forest composition remains fairly consistent throughout the province. Typically the ratios are similar to those found in the central region (Halifax, Hants, Cumberland and Colchester Counties) at: Softwood 42%; Harwood 12%; Mixed wood 22%; Non Forest 18%; Water 6% (Nova Scotia Department of Development, 1986).

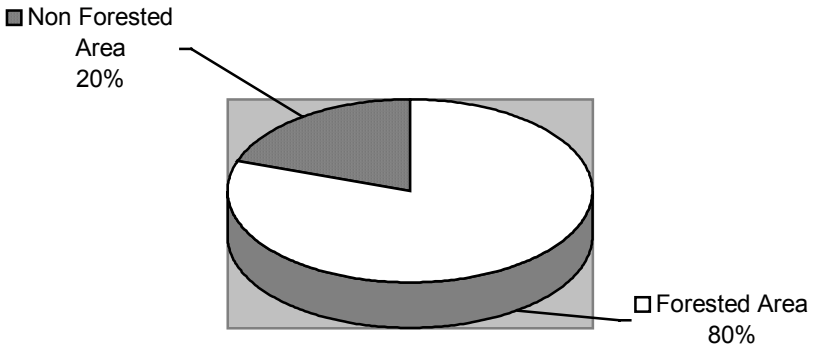
Climate and soils are the main determinates of vegetation cover. Close proximity to the Bay of Fundy creates cool, moist temperatures - prime conditions for softwood growth, particularly Red Spruce. Softwoods including White Spruce, Eastern Hemlock and pines with some shade-intolerant birches and maples dominate shoreline areas and coastal forests. Higher elevations support more hardwood species creating primarily hardwood forests of Sugar Maple, Yellow Birch, American Beech interlaced with Balsam Fir and Red and Back Spruce. In ravines and valley bottoms, softwood forests of Eastern Hemlock, White Spruce, and White Pine are present. Extensive clearing in parts of the Minas Basin including Kings County and around Truro has restricted forests to more marginal sites (Nova Scotia Museum of Natural History, 1996; Fundy Shore Ecotour, date unknown).

The forests around the Minas Basin are typically in various stages of regeneration due to heavy cutting over the years. There is very little climax forest remaining in Nova Scotia and even less old growth forests (Nova Scotia Department of Development, 1986). For example, in Kings County, it is estimated that forests cover 67% of the land base but the forest is primarily second or third generation (KCED, 2001). The Kentville Ravine in Kings County is one of only a few old growth forests in the Minas Basin watershed. The Nova Scotia Nature Trust has been able to protect some climax forest in Hants County through stewardship agreements. (Refer to APPENDIX B).

All lands are divided into forest capability classes under the Canada Land Inventory system, based on their inherent ability to grow commercial wood fibre (Nova Scotia Department of Development, 1986). Capability "is a function of soil quality, depth and drainage, as well as degree and direction of slope" (Nova Scotia Department of Development, 1986; 16). There are no class 1 or 2 lands in Nova Scotia, which are considered the best, due primarily to climatic restrictions. Approximately 40% of Nova Scotia is class 3 and 4, and another 40% is class 5 (Nova Scotia Department of Development, 1986). Almost the entire Minas Basin watershed is either class 3, 4 or 5. There is a large pocket of class 3 south of Truro, and smaller regions south of Windsor and in the Valley portion of Kings County.

Much of the Minas Basin is covered in forest as Map 10 illustrates. Figure 14 shows the percentage of forest cover in the Minas Basin and APPENDIX J illustrates detailed, county level information on forest cover and ownership.

Figure 14
Forest Cover in Minas Basin Watershed



Source: (Nova Scotia Department of Natural Resources, 2001c)

5.4 FRESHWATER

Nova Scotia is rich in fresh water resources including lakes, rivers, ponds, wetlands and streams. They cover approximately 5% of the area of the province (Nova Scotia Department of Development, 1986). There are 45 lakes in Kings County alone (KCED, 2001). In addition there are many groundwater resources including bedrock aquifers (Nova Scotia Department of Development, 1986).

There are over 33 rivers entering the Minas Basin and many more streams and creeks (Nova Scotia Salmon Association, date unknown). The amount of fresh water that enters the Minas Basin and Minas Channel supplies about 15% of the total mean annual flow into the Bay of Fundy (Bousfield and Leim, 1958). Many of these rivers are tidal rivers, with tides reaching up to 30 kilometres inland as in the case of the Shubenacadie River

(Fundy Shore Ecotour, date unknown). The major rivers flowing in the Minas Basin are listed below. Refer to Map 11 for detailed information on their locations.

*Rivers flowing into the Minas Basin:*Avon River
Bass River
Canard River
Chiganois River
Cogmagun River
Cornwallis River
Debert River
Economy River
Five Island River
Folly River
Gaspereau River
Habitant River
Kennetcook River
Moose River
North River
Parrsboro
Pereaux River
Portapique River
River Herbert
Salmon River
Shubenacadie River
St. Croix River
Tennycape River
Walton River
Source: (Atlantic Salmon Federation, date unknown).

5.5 MINERALS

The Minas Basin watershed is well supplied with industrial minerals. These include non-metallic industrial minerals and structural materials. Non-metallic industrial minerals include anhydrite, barite, dolomite, gypsum, limestone, slate, silica sand, and peat moss. Structural materials include sand and gravel, clay and shale, crushed stone and building stone. Non-metallic minerals are found in Hants County and South Colchester County. There are also many areas of sand and gravel occurrences throughout the watershed but the geology of the Windsor Lowlands is most conducive to harbouring them. Metallic mineral occurrences are highest in the Annapolis Valley, Hants County and Colchester County.

5.6 SIGNIFICANT AREAS

Many of the resources found in the area have resulted in significant features and areas that have been protected or acknowledged in some way. They include parks, protected areas, wildlife refugees, archaeological sites, heritage villages, etc. Table 44 and APPENDIX A summarize many of the special features in the Minas Basin watershed that make it appealing for recreation, tourism, and of course, residents.

The Basin is not a conducive environment for many marine mammals because of its high tidal range, coastal erosion and sediments coming from the freshwater rivers, but it is a magnet for waterfowl and shorebirds (Percy, 2001; Nocera, date unknown). Therefore some of the most significant areas in the Basin are the coastal environments, which provide feeding and nesting habitats for birds. These include mudflats, wetlands, marshes, small islands, cliffs and salt marshes.

The largest tracts of salt marsh occur in the Upper Bay of Fundy, particularly the Cumberland Basin and the Southern Bight of the Minas Basin. It is estimated that nearly 80% of the salt marshes in the Bay of Fundy have been lost as a result of extensive dyking (Government of Canada, 1991). In the Upper Bay the relative areas of high and low marsh are 55% and 47% respectively (Government of Canada, 1991). Since only high marsh has been dyked, the amount of high marsh was probably much greater before dyking occurred.

5.7 SOILS

Climate, vegetation, and parent material play important roles in the development of soil (Nova Scotia Department of Development, 1986). In Nova Scotia, soils have developed under conditions of high rainfall, a cool, temperate climate, forest vegetation, and primarily acidic parent materials (Nova Scotia Department of Development, 1986). This has resulted in many of the soils being podzols – which are typically low in fertility and require the addition of lime and fertilizers for good crop production (Nova Scotia Department of Development, 1986). Large portions of the province contain soils that are characterized by their shallowness over bedrock (Nova Scotia Department of Development, 1986). The deeper, agriculturally more productive soils are concentrated in three areas of Nova Scotia. Two of these areas are located in the Minas Basin watershed, the Annapolis Valley and Hants/Colchester Counties (See Map 12). Soil suitability Maps show that the soils of the Minas Basin watershed area are moderately coarse textured and has developed on the Triassic sandstones bordering the Minas Basin (Nova Scotia Department of Development, 1986). In the Annapolis Valley, soils also have developed on Triassic sandstones and shale's underlying the Valley (Nova Scotia Department of Development, 1986).

5.8 WILDLIFE

5.8.1 Birds

The coastal intertidal areas of the Minas Basin are important nesting areas and feeding habitats for hundreds of thousands of resident and migrating waterfowl and shorebirds including plovers, dowitchers and the endangered Semi-Palmated Sandpipers on their journey from the high artic to South America (Nocera, date unknown; Harvey et al, 1998). Most of the coastline of the Minas Basin, especially near the Southern Bight, is a critical migration stopping area and supports the largest numbers of mixed species of shoreline birds in all of North America (RAMSAR, date unknown). Approximately 26,800 hectares of the Southern Bight has international recognition as a RAMSAR (designated in 1987) site and is part of a Western Hemisphere Shorebird Reserve

Network (WHSRN) that recognizes significant habitats of migrating shorebirds from the Artic to South America (Harvey et al, 1998; Percy, 2001; Nocera date unknown). Since RAMSAR and WHSRN carry no legal protection, a federal-provincial management plan for the Minas Basin was completed in 1994, designating beaches, securing key habitats, and declaring the site a Provincial Wildlife Management Area (Harvey et al, 1998). Shorebirds peak in the late summer and early fall with important sites including Kingsport, Pereuax, and Evangeline beaches. The tidal flats provide food for migratory shore birds including mud shrimp, small bivalves and soft-shelled clams. Feeding allows them to accumulate fat reserves that will provide the energy necessary to complete the journey.

Over 100 species of birds breed in the tidal areas including a mix of shore, marsh and upland birds. "The shallows of the Southern Bight and Cobequid Bay are also important wintering areas for Black Ducks, Loons, and Mergansers" (Percy, 2001; 8). Other important areas in the Minas Basin include wetlands and marshes, which serve as foraging areas for ducks and geese during spring and fall migrations (Percy, 2001).

Boot Island at the mouth of the Gaspereau River, serves as a winter home for Common Eiders, Oldsquaws and White-Winged Scoters and a is a nesting site for Double-Crested Cormorants, Herring Gulls, Eider Ducks, Great Black-Backed Gulls and Great Blue Herons (Nocera, date unknown; Percy, 2001).

High cliffs surround Cape d'Or provides habitat for cliff nesting birds such as the Peregrine Falcon (Percy, 2001). Coastal areas and dyke lands are excellent habitat for pheasant, partridge and grouse. Other upland species include the Pileated Woodpecker, Great Horned Owl and Barred Owl. Active farmland in the watershed attracts open-country birds including pheasant, snip, woodcock and hawks. As well, the crow population is high in the Valley and Bald Eagles winter there (Nova Scotia Department of Development, 1986; Fundy Shore Ecotour, date unknown; Nova Scotia Museum of Natural History, 1996; Nocera, date unknown)

"A few notable land birds have occurred in this region" including the Eastern Meadowlark, Eastern Bluebird, Indigo Bunting, and Warbling Vireo (Nocera, date unknown: 7).

5.8.2 Fish

The Minas Basin is a dynamic environment. Its extreme tides keep silt in suspension, "making for extreme turbidity and little penetration of light into the surface waters" (Bousfield and Leim, 1958). For those species that can survive this environment there is little competition and their populations flourish. The region is considered one of low biodiversity - few species, often with large populations (Percy, 2001).

Marine

At least 50 species of fish have been found in the Minas Basin over the years (Percy, 2001). Some of the major ones are listed below.

Fish of the Minas Basin
lewife
Atlantic herring
American eel
American shad
Atlantic cod
Atlantic mackerel
Atlantic menhaden
Atlantic salmon
Blueback herring
Gaspereau
Lumpfish
Mummichog
Pollock
Rainbow smelt
Ray
Sculpin
Sea raven
Silver hake
Silverside
Skate
Smooth flounder
Spiny dogfish
Stickleback
Striped bass
Tomcod
White hake
Window pane
Winter Flounder

At one time fish such as the American Shad, Winter Flounder and the Atlantic Salmon were exceptionally abundant in the Basin and were the backbone of the Fishery (Blousfield and Leim, 1958). The high tides were conducive to weir fishing in the basin, catching such species as Shad, Alewife, Blueback, Atlantic Herring, Striped Bass and Winter Founder (Percy, 2001). Over many decades the stocks of most commercial fish have declined and the fisheries dwindled. Commercial and recreational fishing of the Atlantic Salmon is now banned and there is support for it to be designated as an endangered species (Percy, 2001; Nova Scotia Salmon Association, date unknown). With the decline of many fish species, attention has turned to other species in the Basin such as other ground fish and lobster. There are good lobster grounds in the deeper, gravely portions of the Minas Channel where it is free of silt (Percy, 2001). Seaweeds are generally not abundant because of the harsh tidal environment, but there are some isolated patches typically where suitable hard bottoms are present (Nova Scotia Museum of Natural History, 1996).

Tidal Flats
Soft shell clams are found in the tidal flats of the upper portions of the Minas Basin (Bass River Flats, Economy Flats and Five Islands Flats) producing a half a million-dollar industry (Percy, 2001). "It has been estimated that only about one and a half percent of the Basin's extensive tidal flats, or about 445 acres, have the ideal mix of sand and mud for prime clam habitat" (Percy, 2001: 7). The mudflats found on the north shore of the Minas Basin between Five Island and Bass River is the most productive clam-flats (Percy, 2001). The Southern Bight mudflats have a finer consistency and therefore better suited to burrowing polychaete worms including the bloodworm (Percy, 2001). Worm harvesters have been moving into this area as they deplete resources elsewhere to provide live bait to the sports fishery market (Percy, 2001; Harvey et al, 1998). Baitworm harvesting started being regulated by DFO in 2002. The exposed mudflats also grow microscopic plants called diatoms and are home to shrimp, amphipods, clams, and snails.

Freshwater
Brook Trout are one of the predominant fish species found in the rivers of the Minas Basin, but Brown Trout and Atlantic Salmon are also found in many smaller headwater streams of north shore of Minas Basin. In the tidal rivers of Cobequid Bay, anadromous species such as Atlantic Salmon, Atlantic Sturgeon, American Shad, Striped Bass, and Rainbow Smelt enter these rivers to spawn.

Freshwater Species include:
Brown Bullhead
Chain Pickerel
Lake Whitefish
Rainbow Trout
Speckled Trout
Yellow Perch
American Eel
Lake Trout
Small mouth Bass
White Sucker

5.8.3 Terrestrial animals
A variety of small and large mammals are found in the mixed forest and field environments. The hardwood forests of the Cobequid hills provide excellent moose and White Tailed Deer habitat. In winter, the deer population moves to the bottom slopes and lowlands (Fundy Shore Ecotour, date unknown). Upwards of 300 animals have been counted in one place but herds of 30-40 are more common in this area. Deer are also concentrated in Windsor Lowlands in Hants County (Fundy Shore Ecotour, date unknown).

Fox, fishers and weasels compete with hawks and owls for rodents in the habitats of the watershed. Animals often associated with agricultural lands are found in abundance including raccoons, red fox, woodchuck, skunk, muskrat and mink. Wetland habitats

support Wood Turtles, otters and beavers (Nova Scotia Museum of Natural History, 1996; Fundy Shore Ecotour, date unknown). There is a large breeding colony of Little Brown Bats near Cheverie Mine (Nocera, date unknown).

5.8.4 Plants

In the northwest region of the Minas Basin watershed, flora must be able to tolerate harsher weather conditions, especially in severely wind-blown locations. Artic alpine plants are found here and are extremely uncommon for Nova Scotia. At Cape Chignecto and Cape Blomidon, at least twelve provincially rare plant species have been identified respectively, including White Snakeroot, Creeping Rattlesnake Plantain, and several rare grasses, mosses, and lichens (Fundy Shore Ecotour, date unknown). There are numerous other rare plants in the watershed as well. For example, the prized Orange Chanterelle mushrooms are found in the coniferous forests of old field spruce in the coastal areas (Fundy Shore Ecotour; date unknown). Other varieties of fungi, including the poisonous Amanita Muscaria, are found in mixed and open forest environments. Conifer stands near the coast are often heavily cloaked by Old Man's Beard lichen (Fundy Shore Ecotour, date unknown; Nova Scotia Museum of Natural History, 1996).

5.8.5 Species at Risk

There are many species at risk in Nova Scotia which are protected under the Nova Scotia Endangered Species Act. Many of these could be found in the Minas Basin watershed. Several of these are listed below:
Roseate Tern – endangered
Piping Plover – endangered
Harlequin Duck – endangered
Atlantic Salmon - endangered
Peregrine Falcon – threatened
Wood Turtle – vulnerable
Short-eared Owl - vulnerable
Sanderling – highest conservation concern
(Nova Scotia Department of Natural Resources 2002; Nocera, date unknown)

6.0 LAND AND WATER USE

6.1 LAND OWNERSHIP

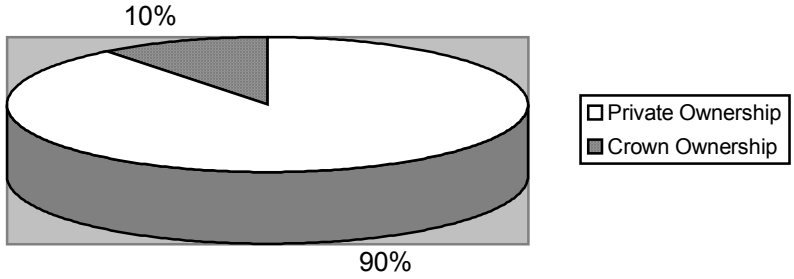
Map 10 shows the amount of crown land owned in the Minas Basin watershed and Map 13 illustrates property ownership in Nova Scotia. Table 15 indicates the quantity of crown land each county has within the Minas Basin watershed. Figure 15 illustrates the division of private and crown land in the Minas Basin watershed.

Table 15
Crown Land by County for the Minas Basin watershed

County	Area (sq km)*
Colchester	492.90
Cumberland	41.97
Hants	342.00
Kings	31.84
Total	**908.71**

Approximate values – calculated by Jennifer Hackett, DFO Coastal and Oceans Management Division

Figure 15
Private/Crown land Ownership in Minas Basin Watershed



Approximate values – calculated by Jennifer Hackett, DFO Coastal and Oceans Management Division

6.2 LAND-USE PLANNING

This section will give general insight into the state of land-use planning around the Minas Basin watershed and some of the issues planning authorities are facing and addressing.

Provincial government regulates land use planning under the Municipal Government Act. Most municipalities have their own planning process, although some of the rural ones do not. The following information was obtained from *"Planning in the Bay of Fundy, A Scoping Exercise",* August 2000, by Stefan Hoddinott and David Mitchell and edited by Ted Cavanagh, Alison Evans and Beth Lewis.

Furthermore, APPENDIX C and APPENDIX D details the Environmental Development Expenditures for each of the towns and Municipalities in the Minas Basin watershed and Figure 16 illustrates what each town and municipality spent on environmental planning and zoning in 1999.

6.2.1 Municipality of the County of Colchester

The Municipality of Colchester has a municipal planning strategy (MPS) and land use by-laws. Separate councils have been created in some urban areas such as Bible Hill where urban sprawl is occurring. The rest of the municipality is divided into western,

central and northern, each with its own strategy. The MPS outlines the floodplain restrictions for the Salmon River and plans also exist for recreation and open space areas.

6.2.2 Town of Truro

Truro is located in the Salmon River floodplain. The town has created a municipal planning strategy (MPS) and land use by-laws that dictate the types of land uses that are permitted and encouraged. It addresses such issues as buffer zones, sensitive areas and drainage. The MPS was revised in 1992 and recent amendments were made in 1998. The town works closely with the Municipality of Colchester on issues of wastewater, solid waste and have created a Joint Advisory Committee on floodplain development. A new sewage treatment plant was installed in effort to reduce the town's impact on the Salmon River. One of the most contentious issues the planners are dealing with now is development on the floodplain. According to federal and provincial mapping, much of the town's new commercial area is built in an unsafe area.

6.2.3 Cumberland Joint Services Management Authority

The municipal planning department was revived in 1991-1992 and is responsible for planning in the rural unincorporated areas within Cumberland County. Towns within the County such as Parrsboro all have staff and independently administer development control. The County has a limited plan that regulates development and consists of two zones which are 'cemetery' and 'general'.

6.2.4 The Municipality of the County of Kings

The municipality has an established system of villages, which are responsible for providing a number of local services. However, they do not have authority to do their own planning but can make recommendations to the municipality. There are seven villages, including growth areas such as New Minas.

The existing plan reflects the different uses and concerns in the municipality. Zones have been created for land uses such as cottage development, agriculture, residential development, water supply protection and environmental open spaces. Agriculture is a major industry in this area, and the municipality is dealing with a variety of issues including protection of agricultural land from urban development and the protection of ground water resources from agricultural activities.

6.2.5 Town of Wolfville

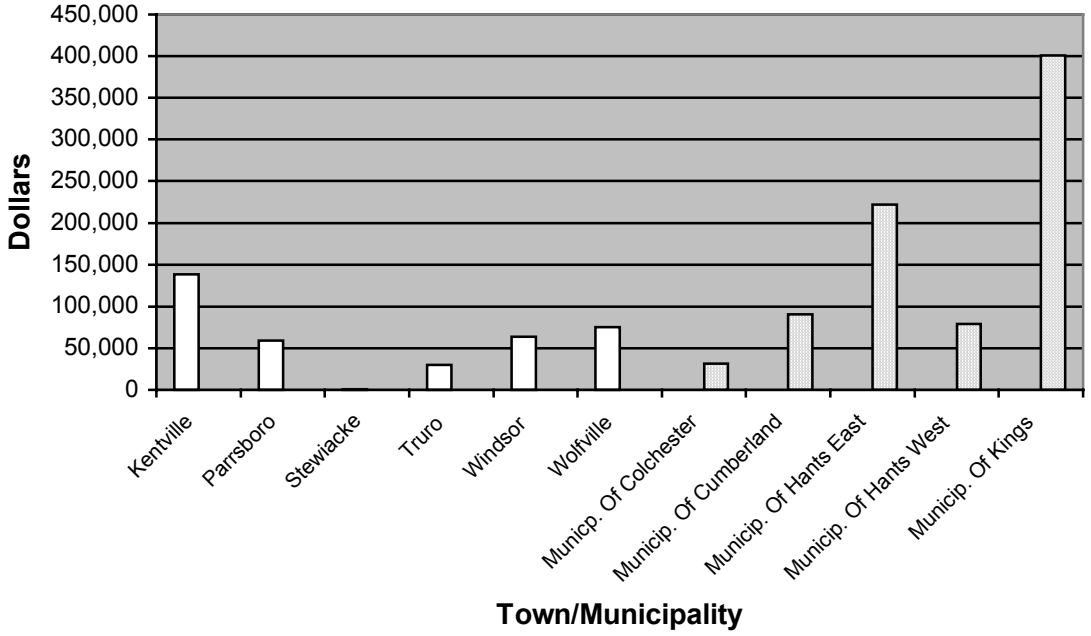
The first municipal planning strategy (MPS) and by-laws were passed in 1988. The strategy zoned the dyke-lands for industrial used but was legally challenged to prevent much of the dyke lands from being zoned industrial. The challenge failed but the town revised the strategy in 1999 to reflect many of the concerns facing the town. It has been a difficult challenge to balance the need for urban development and traditional uses of the dyked-land including recreation and farming. They are aware that expanding development onto the floodplain and dyke-lands is not a positive strategy and have begun protecting dyke-lands by limiting development in the existing industrial zone.

6.2.6 Town of Windsor and the Municipality of the District of West Hants

Both the Town of Windsor and the Municipality of the District of West Hants have established Planning Advisory Committees. They agreed to form a Joint Planning Advisory Committee to resolve planning conflicts between the two municipalities. The planner has helped the two municipalities create separate municipal planning strategies and land use by-laws.

The Town of Windsor municipal planning strategy and land use by-laws reflect the town's history and desire for quality of life. They are currently addressing the issue of urban sprawl and downtown revitalization. Controlling development and growth of bedroom communities has also been identified as a major priority. The planning strategy for the Municipality of the District of West Hants is broken down into a number of areas including Falmouth, Upper Falmouth, and three other general areas in an effort to reflect the various differences that exist in the municipality. The municipality relies heavily on agriculture and forestry. Protection of dyke-lands and agricultural lands is a major priority of the municipality.

Figure 16
Town/Municipality Expenditures on Environmental Planning and Zoning (1999)



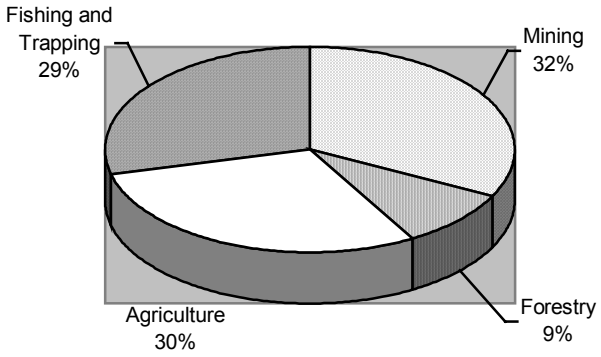
** the town of Stewiacke had an expenditure of $598, the towns of Berwick and Hantsport had zero expenditures in 1999*
Source: (Service Nova Scotia, 2000)

7.0 TRADITIONAL RESOURCE ACTIVITIES

The province of Nova Scotia relies heavily on traditional resource industries such as fishing, mining and agriculture. Figure 17 illustrates Gross Domestic Product for these Primary resource sectors. Many of these resource industries are very active in the Minas

Basin watershed. As well, newer activities such as manufacturing and tourism are becoming increasingly more important in the watershed

Figure 17
Primary Resource Sector Gross Domestic Product for Nova Scotia (1999)
(Millions of constant 1992 dollars)



Source: (Nova Scotia Department of Natural Resources, July 2001)

Land and water use has evolved as a result of the resources available in the watershed. The waterscape is used for a commercial and recreational fishery as well as for recreation and tourism. Canoeing, kayaking, river rafting are just a few of the recreational and tourist attractions. Land throughout the watershed is also being used for recreation and tourism including ATV riding, hiking, bird watching, archaeological digs, etc. More traditional uses of the land base are for agriculture, forestry, urban development and mining. This section will explore the land and water activities that are happening around the Minas Basin watershed in more detail.

7.1 COMMERCIAL FISHERY

7.1.1 History

There have been at least 50 species of fish found in the Minas Basin (refer to section 5.8.2). Weir fishing was the most popular fishing method for years because of its suitability with the tidal environment. Weir fishing was primarily done along the north shore of the Minas Basin (Percy, 2001). Today there are just a handful of weirs in operation but at one time there was almost a continuous line of them along the north shore (Bousfield and Leim, 1958).

In earlier times, the most important fishery in the area was for the American Shad, but by 1910 the shad population had fallen sharply (Bousfield and Leim, 1958). Shad moved into the Minas Basin in late May to early June and were caught in the weirs as they moved upriver to spawn. Atlantic Salmon was also an important fishery in the Minas Basin. The salmon spawned in many rivers of the Basin, but were primarily caught in the Avon and Economy Rivers, and in Cobequid Bay (Bousfield and Leim, 1958). By the 1950's salmon numbers fell sharply and today commercial and recreational salmon

fisheries are now banned (Nova Scotia Salmon Association, date unknown). Weirs and drift nets were used in both the shad and salmon fisheries (Bousfield and Leim, 1958). Other minor fisheries have been for gaspereau, herring, cod, pollock, haddock, and eels (Bousfield and Leim, 1958). There is still a gaspereau fishery on the Gaspereau River in Kings County.

The strong currents caused by the changing tides have always provided a "natural control" of harvesting in the Minas Basin until recently. In the late 1980's larger trawlers with more powerful engines from the lower Bay, having fished out flounder stocks there, moved into the Basin (Percy, 2001). As a result the flounder stocks also fell and have still not fully recovered. This practice has been of increasing concern to the local fishermen.

Today there are 98 vessels licensed in the Basin and they fish for a mix of ground fish and lobster in different seasons. Lobsters are primarily found in the deeper portions of the Minas Channel where the bottom is gravely. The Minas Basin and Minas Channel are part of Lobster Zone 35. The lobster season is March 1- July 31 and Oct 15 – Dec 31.

Harvesting of the soft-shell clam has also been a large and lucrative fishery in the Basin over the years. Commercial clamming started in the early 1940's and has had many peaks and valleys (Percy, 2001). In 1982, there were 110 full-time licensed clammers, many part-timers, and 3 processing plants producing over 680 tonnes worth half a million dollars (Percy, 2001). Overexploitation led to clam digging regulations being enacted in 1993.

Baitworm harvesting has been developing around the Southern Bight of the Minas Basin. The worms are dug and exported to the northeastern states for live bait used in recreational fisheries (Percy, 2001; Nocera, date unknown). The harvest increased during the mid 1980's after exploitation of the worm populations in the Gulf of Maine (Percy, 2001). The harvest is now regulated by DFO. See Map 14 for locations and dates of harvest openings.

Because of the extreme currents and siltation in the Minas Basin, there is not a lot of seaweed growth. However, some Kelp is picked at extreme low tide near Cape d'Or and there is some Dulsing at Two Islands, near Parrsboro.

7.1.2 Fishing Regions

The province of Nova Scotia is divided into 44 Fisheries Statistical Districts for the collection of fisheries related data. Data is collected by the federal Department of Fisheries and Oceans, primarily through a system of sales slips completed for each purchase by the fish buyer. The Minas Basin and Minas Channel includes districts 40, 41, 42, 43 and 44 (See Map 15) (Nova Scotia Department of Development, 1986). Landings recorded are where fish catches are landed, and are not necessarily reflective of where fish are caught. For example, these figures would not take into account fish caught in Minas Basin by vessels unloading their catches elsewhere like Digby.

7.1.3 Number of Fishermen and Vessels

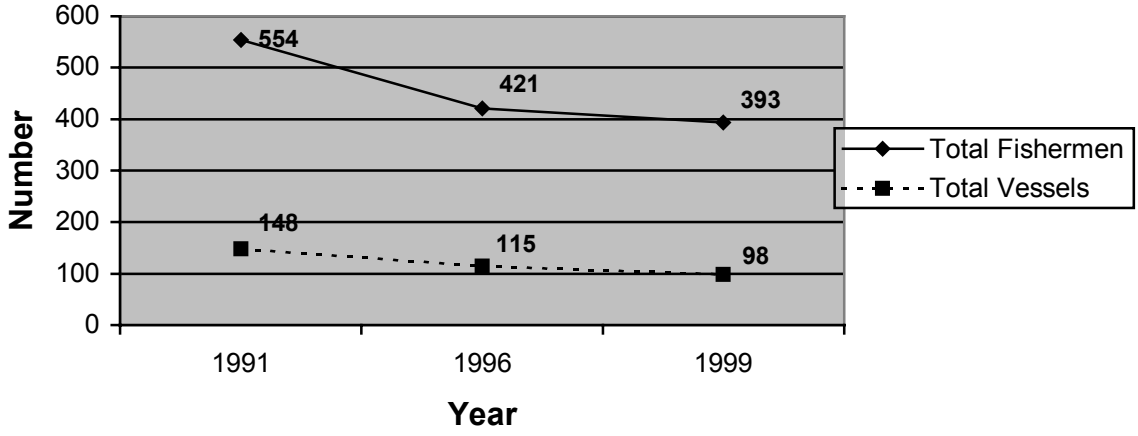
The total number of registered fishermen and vessels has decreased over the last 10 years by 28% and 34% respectively (See Table 16 and Figure 18). APPENDIX E lists the primary fishery organizations operating in the Minas Basin.

Table 16
Number of Fishermen and Vessels Registered in the Minas Basin and Minas Channel (Zones 40-44) - 1991, 1996 and 1999

Fishing Zone	1991*		1996		1999	
	Fishermen	Vessels	Fishermen	Vessels	Fishermen	Vessels
Kings County (40)	62	32	54	26	54	21
Cape Split Area (41)	79	20	53	13	53	15
Hants County (42)	68	39	43	26	40	20
Colchester County (43)	242	39	168	26	144	22
Cumberland County (44)	103	23	103	26	102	20
Total	**554**	**148**	**421**	**115**	**393**	**98**

** 1991 data is before the moratorium*
Source: (Department of Fisheries and Oceans, special ad hoc tabulations 2002)

Figure 18
Total Number of Fishermen and Vessels in Minas Basin and Minas Channel (Zones 40-44) – 1991 to 1999



Source: (Department of Fisheries and Oceans, special ad hoc tabulations 2002)

7.1.4 Landings in Minas Basin and Minas Channel

The primary landings in each of the fishing zones (40-44) derived from APPENDIX F are as follows. Figure 19 also shows the percentage of landings in each zone by species.

Cape Split Area (Zone 41):
Primary landings: Lobster, Alewife and Flounder
Increase in Winter Flounder, Dogfish and Lobster

Decrease in Herring and Alewife

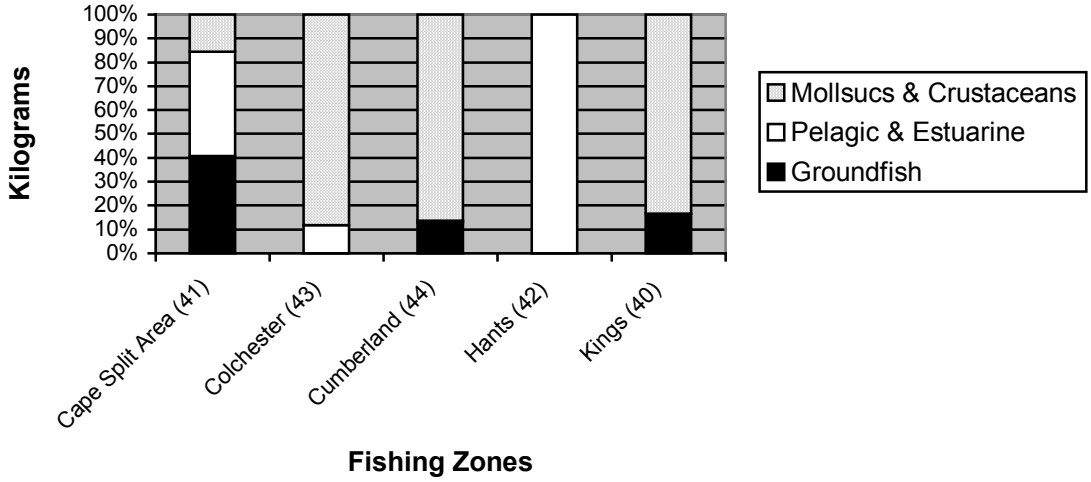
Colchester County (Zone 43):
Primary landings: Alewife, American Shad, Soft Shell Clams and Lobster
Increase in Eels, Sea Scallops
Decrease in Flounder, Herring, Striped Bass, Sturgeon, Soft Shell Clams

Cumberland County (Zone 44):
Primary landings: Sea Scallops and Lobster
Increase in Dogfish, Lobster
Decrease in Flounder, Herring, Soft Shell Clams, Atlantic Halibut

Hants County (Zone 42):
Primary landings: Alewife, American Shad
Increase in Alewife, Eels
Decrease in Soft Shell Clams, Herring, Flounder

Kings County (Zone 40):
Primary landings: Cod, Haddock, Flounder, Sea Scallops, Lobster
Increase in Crab, Lobster, Haddock, Dogfish
Decrease in American Plaice, Herring, American Shad, Sturgeon, Sea Scallops

Figure 19
Percentage Quantity of Landings in Minas Basin and Minas Channel (Zones 40-44) by Species

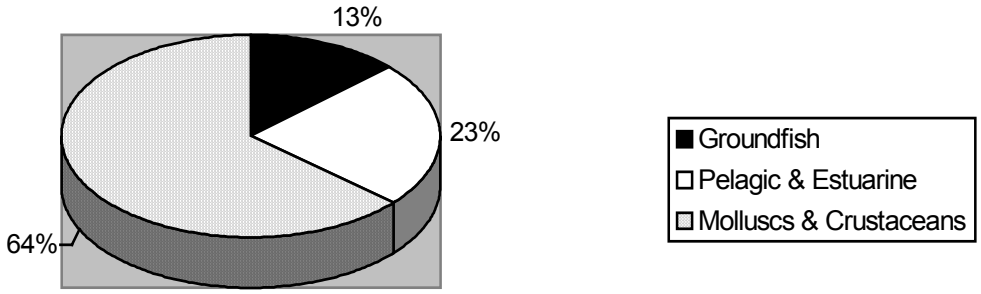


Source: (Department of Fisheries and Oceans Canada, special ad hoc tabulations 2002)

7.1.5 Quantity and Value of Landings

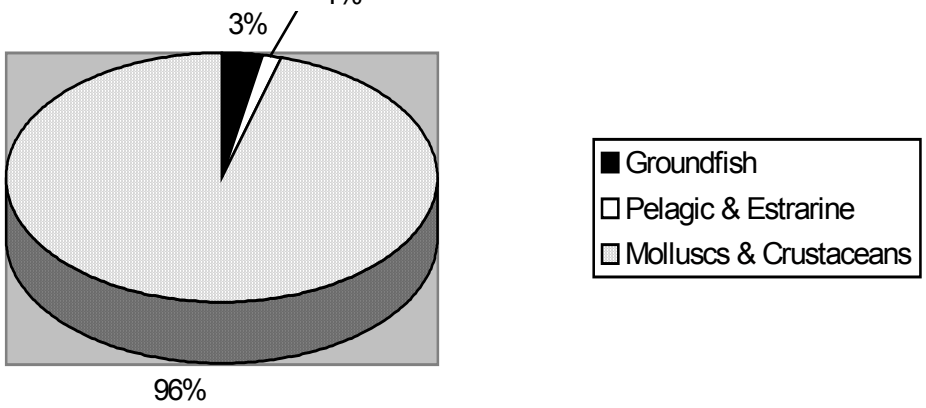
Figures 20 and 21 illustrate the total quantity and value of landings in the Minas Basin and Minas Channel respectively. Raw data for these figures are contained in APPENDICES F through H. Figure 22 illustrates that the quantity of landings has decreased but the value of the landings has increased. This may be a result of more valuable species such as the increase in lobster catch.

Figure 20
Total Quantity of Landings in Minas Basin and Minas Channel (Zones 40-44) by Species (1999)



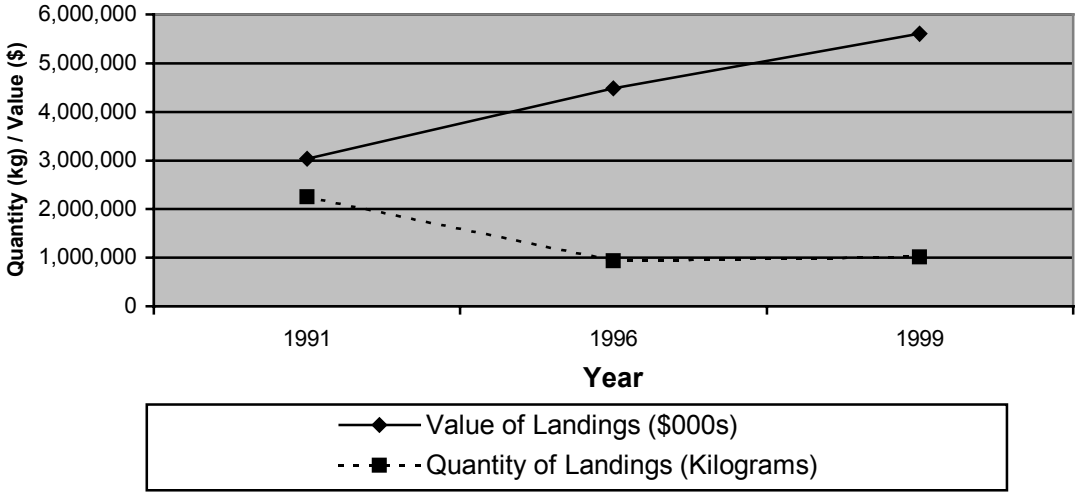
Source: (Department of Fisheries and Oceans Canada, special ad hoc tabulations 2002)

Figure 21
Total Value of Landings in Minas Basin and Minas Channel (Zones 40-44) by Species (1991)



Source: (Department of Fisheries and Oceans Canada, special ad hoc tabulations 2002)

Figure 22
Trends in Total Value and Total Quantity of Landings in Minas Basin and Minas Channel (Zones 40-44) – 1991 to 1999



Source: (Department of Fisheries and Oceans Canada, special ad hoc tabulations 2002)

Table 17 shows a quick summary of the quantity and value of landings, number of fishermen and number of vessels operating in the Minas Basin.

Table 17
Summary of Fishery Statistics, Minas Basin and Minas Channel (Zones 40-44) (1991 to 1999)

	1991	1996	1999
Value of Landings ($000s)	3,029,632	4,485,269	5,602,848
Quantity of Landings (Kilograms)	2,261,124	934,163	1,013,758
Number of Fishermen	554	421	393
Number of Vessels	148	115	98

Source: (Department of Fisheries and Oceans Canada, special ad hoc tabulations 2002)

7.2 RECREATIONAL FISHERY

Angling is a major recreational activity in Nova Scotia. There are approximately 6,700 lakes, 100 rivers, numerous brooks and over 7,400 km of coastline in Nova Scotia (Nova Scotia Department of Agriculture and Fisheries, 2000). There is also ice fishing during the winter months. There are 38 species of fish inhabiting fresh waters and over 300 saltwater species in the estuarial and coastal waters of Nova Scotia (Nova Scotia Department of Agriculture and Fisheries, 2000). The main species caught by anglers are

trout (three species), Small Mouth Bass and Smelt. Other species of interest are Atlantic Salmon, Striped Bass, landlocked salmon, White and Yellow Perch, Bullhead, Eel, Chain Pickerel, Mackerel, Cod, Pollock, Flounder and Tuna. Speckled (brook) Trout is the most preferred and sought after species in Nova Scotia (Nova Scotia Department of Agriculture and Fisheries, 2000).

Hants and Kings Counties are in Provincial Recreational Fishing Area #5. Colchester and Cumberland Counties are in Recreational Fishing Area #6 and Halifax County is in Recreational Fishing Area #3. Species typically found in these fishing areas are Speckled (brook), Rainbow and Brown Trout, Atlantic Salmon, Small Mouth Bass, Chain Pickerel, Shad, landlocked salmon, and other saltwater species (Nova Scotia Department of Agriculture and Fisheries, 2002b).

7.2.1 Fishing Seasons

(General – see 2002 Angling Regulations for special provisions: Nova Scotia Department of Agriculture and Fisheries, 2002b)

Sport fishing: Speckled (Brook) Trout, Brown Trout, Rainbow Trout, landlocked salmon

RFA #3 (Halifax County)

Inland waters – April 1 to September 30

RFA#5 (Hants and Kings Counties)

Inland and Tidal waters – April 1 to September 30

RFA #6 (Colchester and Cumberland Counties)

Inland Waters – April 1st to September 30th

Tidal Waters – April 15th to September 30th

Special Provisions for Sport fish (trout and landlocked salmon)

- Speckled Trout – no retainment from September 1st to 30th
- Use of natural bait prohibited in inland waters for all trout species and landlocked Salmon
- Small Mouth Bass restricted during spawning season from April 20th - June 9th

Other Angling Seasons:

Striped bass

Inland Waters – same as for sport fish

Tidal Waters – open all year

Smelt

April 1st – June 15th for dip-netting, closed Fridays, Saturdays and Sundays

White Perch, Yellow Perch, Shad, Gaspereau, Brown Bullhead, Chain Pickerel, Lake Whitefish, White Sucker, Eel

Inland Waters – same as for sport fish

Tidal Waters – open all year

Atlantic Salmon – check individual areas

U-Fish Operations – seasons and licences do not apply

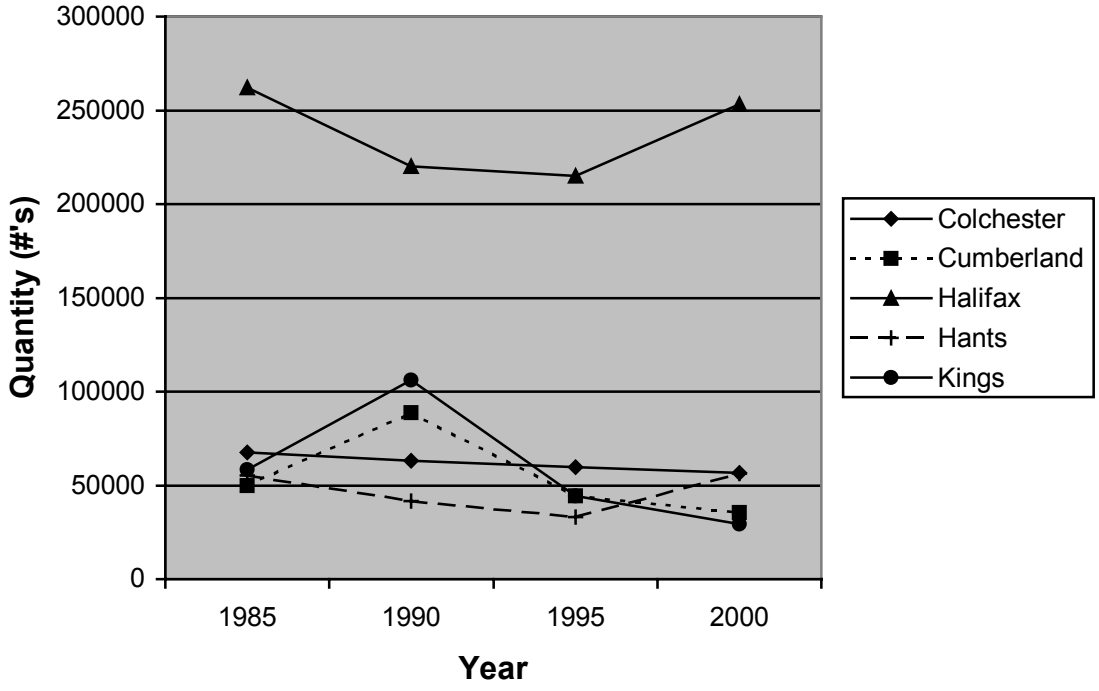
Source: (Nova Scotia Department of Agriculture and Fisheries, 2002b)

7.2.2 Participation

There are two types of recreational fishing licenses issued in the province. A general license is required to fish species other than salmon in provincial fresh waters for all anglers over 16 years of age. A resident license is $17.25: non-resident is $46.00. All anglers who wish to fish salmon are required to purchase a salmon licence which range from $5.75 for under 16 years to $120.75 for a non-resident license (Nova Scotia Department of Agriculture and Fisheries, 2002b). A license is not required to fish most saltwater species. In 2000 there were 64,621 licensed anglers in Nova Scotia, 91% whom fished. Of those who fished, 96% were residents of the province and 4% were non-residents (Nova Scotia Department of Agriculture and Fisheries, 2000).

Anglers spent approximately 1.2 million days fishing in Nova Scotia, of which 78% were in fresh water and 22% in salt water (Nova Scotia Department of Agriculture and Fisheries, 2000). This fishing effort was 7% higher than in 1995. Resident anglers fished an average of 18.5 days in 2000, while non-residents anglers fished an average of 5.4 days. Angling was highest in Halifax, Cape Breton and Lunnenburg counties by resident anglers. Non-residents spend 26% of their effort in Inverness County. Table 18 and Figure 23 show results for counties within the Minas Basin watershed. Most counties have shown consistent efforts since 1985 but other counties such as Kings and Cumberland have had dramatic fluctuations since 1980 (Nova Scotia Department of Agriculture and Fisheries, 2000).

Figure 23
Angling Efforts for Counties in the Minas Basin watershed (1985-2000)



Source: (Nova Scotia Department of Agriculture and Fisheries, 2000)

Table 18
Angling Efforts for Counties in the Minas Basin watershed (1985-2000)

County	Days Fished by Licensed Anglers			
	1985	**1990**	**1995**	**2000**
Colchester	67,741	63,096	59,572	56,788
Cumberland	49,778	88,812	44,280	35,415
Halifax	262,256	219,970	215,116	253,296
Hants	55,459	41,589	33,097	56,379
Kings	58,274	106,036	44,228	29,508
Total	**493,508**	**519,503**	**396,293**	**431,386**
Nova Scotia	1,215,934	1,448,464	1,152,870	1,163,590
% Of NS	**40%**	**36%**	**34%**	**37%**

Source: (Nova Scotia Department of Agriculture and Fisheries, 2000)

7.2.3 Harvest

Licensed anglers caught an estimated 4.7million fish (retained 2.1 million - 45%) in 2000. Seventy-one percent of all active anglers practised catch and release in 2000 (primarily on a voluntary basis). An average of 72 fish were caught per angler, of which 32 were retained. Retention varied among species, for example, only 1.1% of Small Mouth Bass were retained while 96.2% of Smelt was kept. Of the freshwater species, Speckled (Brook) Trout, Rainbow Trout and Small Mouth Bass were the species most frequently caught in 2000. Saltwater species were also popular catches among licensed anglers, especially Smelt. Speckled (Brook) Trout showed their first increase in catch since 1980 and Small Mouth Bass catches were about 3 times higher than in 1995. However, in areas where it is still permitted, Atlantic Salmon catches continue to decline and are at their lowest levels since 1980. Over the entire fishing season of 2000, resident anglers on average each caught a total of 221 Smelt, 97 Small Mouth Bass, 38 Yellow Perch and 35 Speckled (Brook) Trout (Nova Scotia Department of Agriculture and Fisheries, 2000)

Based on a survey conducted by the Nova Scotia Department of Agriculture and Fisheries, forty-three percent of anglers who had fished in the province for five years thought the fishing had declined from 1995-2000 (Nova Scotia Department of Agriculture and Fisheries, 2000). They attributed this to acid rain, pollution, over fishing and habitat degradation. They thought more stocking programs, increased enforcement and habitat improvement should be implemented to improve recreational fishing in Nova Scotia (Nova Scotia Department of Agriculture and Fisheries, 2000).

7.2.4 Expenditures and Investments

Although there has been only a small increase in the participation level of recreational fishing in the province, there has been a substantial increase in expenditures. In 2000, $21.3 million was spent on supplies and services related to recreational fishing. This was a 12% increase from 1995 but 5% less than 1990. Another $35.2 million was spent on major durables and property for fishing. Therefore a total of $56.5 million was spent on

recreational fishing in 2000, an increase of 38.1% from 1995 (Nova Scotia Department of Agriculture and Fisheries, 2000).

7.2.5 Stocking

Many lakes, ponds, creeks and rivers in the Minas Basin watershed are stocked yearly with Speckled Trout (unless otherwise indicated) by Nova Scotia Department of Agriculture and Fisheries. Some of these stocking areas are listed below.

Colchester:

Davis Lake – Derby
Debert (Rayners) Pond – Derby
Kiwanis Pond – Derby
Little Dyke Lake

Cumberland:

Parrsboro Abboiteau – Derby

Halifax:

Cooks Brook Pond – Derby
First Lake
Kelly Lake
Kinsac Lake
Lewis Lake
Mill Lake
Second Lake
Springfield Lake

Hants:

Enfield Pond – Derby
Fire Dept. Ponds (Walton)
McGrath Lake
Meadow Pond
Murphy Lake (Mt. Uniacke) – Derby
D.U. Pond (Maitland) – Derby
Pentz Lake
St. Croix Pond

Kings:

Lumsden Pond
Sunken Lake (speckled and rainbow)
Silver Lake

Source: (Nova Scotia Department of Agriculture and Fisheries, 2002a)

7.3 AQUACULTURE

Aquaculture is a fast growing segment of the fishing industry in Nova Scotia. The value of the aquaculture industry in Nova Scotia tripled from 1993 to 1997 (MacNutt, date unknown). Currently there are 15 licensed aquaculture sites in the Minas Basin watershed (See Table 19 and Map 16 for their locations), including U-Fish establishments and hatcheries (Nova Scotia Department of Agriculture and Fisheries, 2001). APPENDIX I summarizes contact information for the aquaculture sites in the Minas Basin watershed. The amount of Aquaculture undertaken in the Minas Basin watershed is relatively low compared to other areas of the province producing only 0.2% of the quantity and 7% of the value of provincial totals as illustrated in Table 20.

Table 19
Aquaculture Activity in the Minas Basin watershed (2001)
(All licenses have been issued)

Licence No.	Proponent	Species	Water body	County
0213	Larry MacPhee et. Al	Rainbow Trout	U-Fish	Hants
0517	Elizabeth Semple	American Oyster	Lazy Bay	Cumberland
0583	Mike Cameron	Speckled Trout; Rainbow Trout	U-Fish	Colchester
0862	Darrell J. Westerman	Rainbow Trout; Speckled Trout	U-Fish	Colchester
0964	Beavers Tide View Mini Golf	Rainbow Trout; Speckled Trout	U-Fish	Colchester
0973	Alderbranch U-Fish	Speckled Trout	U-Fish	Colchester
1036	Mike Cameron	Rainbow Trout; Speckled Trout; Artic Char	Hatchery	Colchester
1050	Tidal River Farms Limited	Artic Char	Land based	Colchester
1076	Broadview Farms	Speckled Trout	U-Fish	Kings
1077	Keith Tupper	Rainbow Trout; Speckled Trout	U-Fish	Kings
1094	Brian Sullivan	Rainbow Trout; Speckled Trout	Land based	Colchester
1156	Darren Cameron	Artic Char; Rainbow Trout	Land based	Colchester
1209	Atlantic Ova Pro Ltd.	Atlantic Salmon	Land based	Cumberland
8279ALT	Two Rivers Bass Hatchery	Striped Bass	Hatchery	Colchester
8364	Simme/Paula Altenburg	Eel	Land based	Colchester

Source: (Nova Scotia Department of Agriculture and Fisheries, 2001)

Table 20
Total Quantity and Value of Aquaculture Landings
In the Minas Basin watershed (2000)

	Total Minas Basin Watershed (2000)	Total Nova Scotia (2000)	Minas Basin as % of Nova Scotia
Quantity (kgs)	36,600 kgs	121,618,948 kgs	0.2%
Value ($)	$382,813.00	$50,469,494.00	7%

Source: (Nova Scotia Department of Agriculture and Fisheries, 2001)

7.4 AGRICULTURE

In 1996 there were 4,453 reported farms in Nova Scotia. This was down 11.7% from 1981 but up 11.9% from 1991. The province's agricultural industry is very diverse with crops, fruits, dairy, and poultry products (Nova Scotia Department of Finance, 2000).

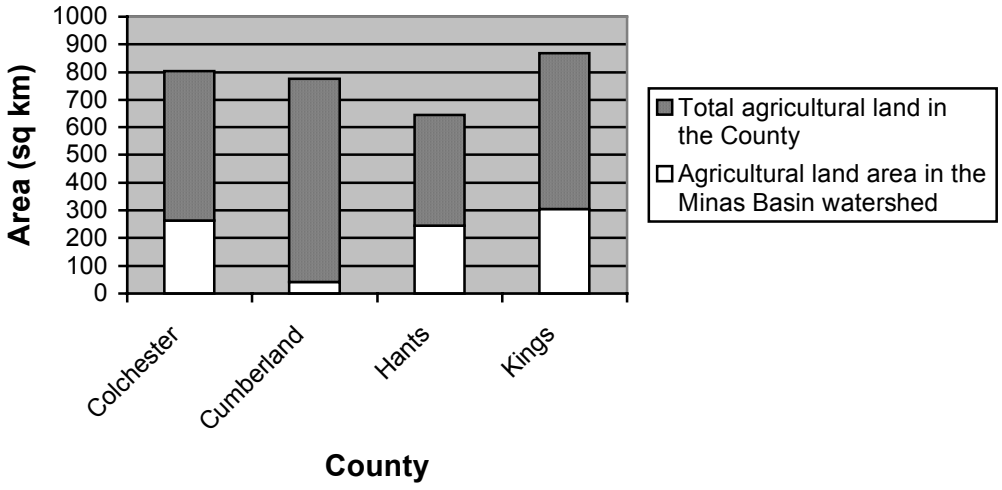
The Minas Basin watershed lies primarily in Census Agriculture Regions 2 (Annapolis valley) and 3 (Central Nova Scotia). Agricultural statistics are available by county only, it is important to remember that large portions of the counties are not in the watershed (See Map 10). Table 21 and Figure 24 summarize the amount of agricultural land in the Minas Basin watershed for each county and compare it to the total area of agricultural land in each county. The agricultural data below will therefore not give an accurate reflection of agricultural activity specific to the Minas Basin watershed.

Table 21
Agricultural Land by County in the Minas Basin watershed

County	Area in Minas Basin watershed (sq km)	Total area in the County (sq km)
Colchester	264.43*	539.82
Cumberland	41.59*	733.63
Hants	245.02*	400.21
Kings	305.60*	562.33
Total	**856.64***	**2,236.99**

Source: * *Approximate values – calculated by Jennifer Hackett, DFO Coastal and Oceans Management Division;* Statistics Canada 1997b

Figure 24
Area of Agricultural Land by County



Source: * *Approximate values – calculated by Jennifer Hackett, DFO Coastal and Oceans Management Division;* Statistics Canada 1997b

County Profiles:

Kings County has some of the most fertile soils in the province and therefore is one of its prime agricultural areas. Most of the agricultural activity takes place in the wide valley floor where it is protected from the Bay of Fundy by the north mountain. It was the Acadians who first developed a prosperous agricultural base and their legacy remains with the hundreds of acres of dyked land. Kings County has the most farms in Nova Scotia and the second highest total farm land behind Cumberland County. Approximately 58% of this district is being farmed, 18.6% of it actively (KCED, 2001). It also has the largest amount of Gross Receipts of any county in Nova Scotia, perhaps suggesting the production of more valuable produce. Kings County produces 90% of the provincial tree fruits; 90% of the cranberries and high bush blueberries; 84% of chickens; 75% of vegetable and potatoes; 82% of turkeys and 60% of hogs in the province (KCED, 1998). Most of the one million fruit-bearing trees in Kings County are apple trees. Apple orchards cover 9,000 acres in Kings County and the average apple production is 3 million bushels per year. Approximately 1.6 million bushels are processed and the other 1.4 million are sold fresh (KCED, 1998).

Colchester County is third in the province for the number of farms and total area of farmland behind Kings County and Cumberland County. They rank second in the total expenses and total receipts which shows that even with a smaller area and number of farms, they are producing a valuable product. Agriculture is still a vital component of the county's economy but it is no longer the dominant employer (MacNutt, date unknown).

Hants County "can be divided into two distinct sections: the upland and the lowland plains. The first agriculture development began with the settlement of the Acadians in the 18th century. The early settlers erected dykes on the tidal marshes and grew wheat, barley, rye, oats, hemp, peas, cabbage and flax" (Keddy, November 2000; 44). Falmouth developed as the fruit producing area of the county. Today, the principle farming in Hants County is for dairy, beef, fruit and vegetables (Keddy, November 2000). Many dairy farms are located in the Shubenacadie area and specialty crops such as cereal grains are grown in the Noel area (Keddy, November 2000). There are eight blueberry operations in the County occupying 148 hectares of land. Most blueberries are grown near Gore and Rawdon and soybeans and grain corn are grown near Windsor (Keddy, November 2000). The county has one of the largest apple packers in the province and there is also a low bush blueberry processing facility (Keddy, November 2000). Hants County is within close proximity to Halifax, so large amounts of produce are shipped there.

Most of *Cumberland County's* farmland is most likely outside the watershed area (See Map 16). However, the area within the watershed is prime land for growing blueberries and there are several blueberry farms located there.

7.4.1 Number of Farms

There are 1,554 farms in the counties of the watershed. This is about 54% of farms operating in Nova Scotia (3,004 total) (Statistics Canada, 1997b). Most farms are located in Colchester, Cumberland and Kings Counties. However, most of the farms in Cumberland County are likely outside the Minas Basin watershed. Each of these counties has approximately 12-15% of total farms in Nova Scotia. The majority of farms are operated as sole proprietorships as illustrated in Table 22 and Figure 25.

Table 22
Operating Arrangements for Counties in the Minas Basin watershed (1996)

County	Operating Arrangements				Total # farms
	Sole Proprietorship	Partnerships	Corporation	Other	
Colchester	331	120	86	1	538
Cumberland	380	111	61	4	556
Hants	257	79	56	1	393
Halifax	134	37	39	0	210
Kings	452	130	118	7	707
Total	**1,554**	**477**	**360**	**13**	**2,404**

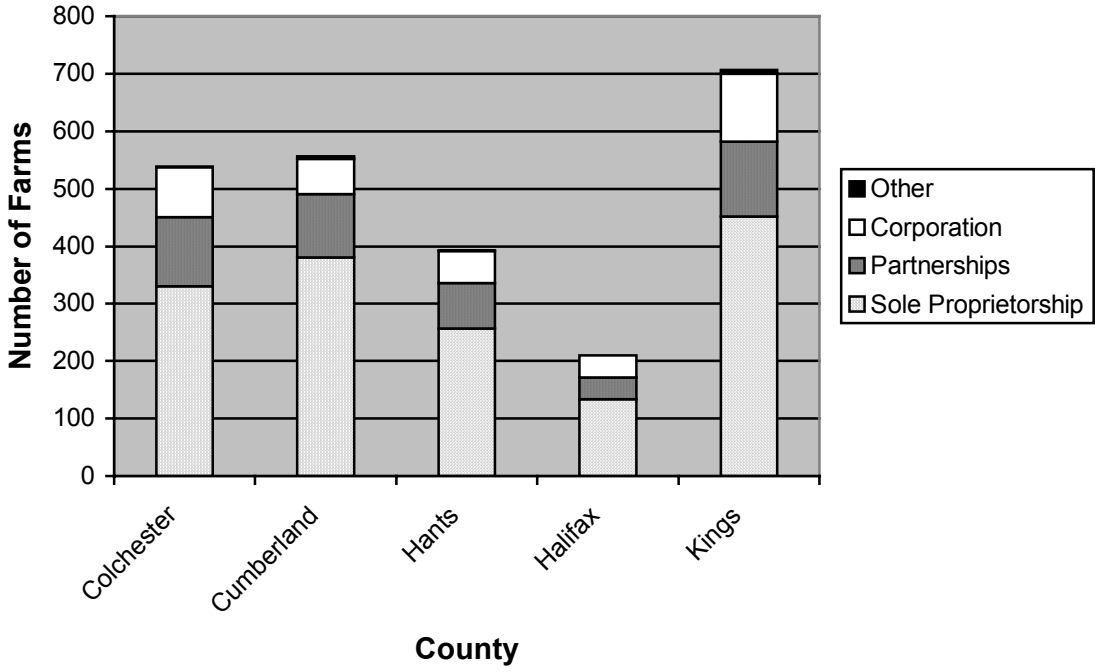
Source: (Statistics Canada, 1997b)

7.4.2 Total Farmland

Total area of farmland in the counties of the Minas Basin watershed is approximately 597,967 acres; about 56% of Nova Scotia's farmland (1,055,941 acres total) (Statistics Canada, 1997b). Most of the farmland is within Cumberland, Colchester, Hants and

Kings Counties (See Table 23 and Figure 26). Again, most of the farmland in Cumberland County is likely outside the Minas Basin watershed. Even so, with an area of only 16% of Nova Scotia, a significant amount of farming is done in the Minas Basin watershed.

Figure 25
Operating Arrangements for Minas Basin Watershed Counties (1996)



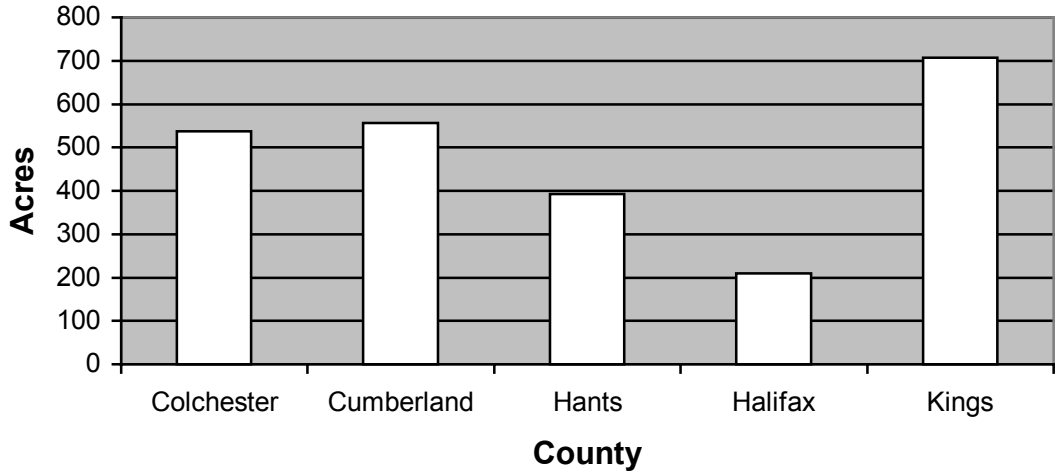
Source: (Statistics Canada, 1997b)

Table 23
Farm Land Area Classified by Tenure for Counties in Minas Basin watershed (1996)

County	Farms Reporting	Acres	% of the total farmland in Counties of the Minas Basin watershed
Colchester	538	133,393	22%
Cumberland	556	181,283	30%
Hants	393	98,895	17%
Halifax	210	45,441	8%
Kings	707	138,955	23%
Total	**2,404**	**597,967**	**100%**

Source: (Statistics Canada, 1997b)

Figure 26
Farm Land Area for Counties in Minas Basin watershed (1996)



Source: (Statistics Canada, 1997b)

7.4.3 Farm Ownership

Table 24 illustrates that the majority of the farmland in the counties of the Minas Basin watershed is owned rather than leased.

Table 24
Farmland Ownership for Counties in the Minas Basin watershed (1996)

	% Area Owned	*% Area Leased*
Colchester	88	12
Cumberland	95	5
Hants	85	15
Halifax	92	8
Kings	82	18
Total of Minas Basin Counties	**86**	**14**
Nova Scotia	**88**	**12**

Source: (Statistics Canada, 1997b)

7.4.4 Farm Size

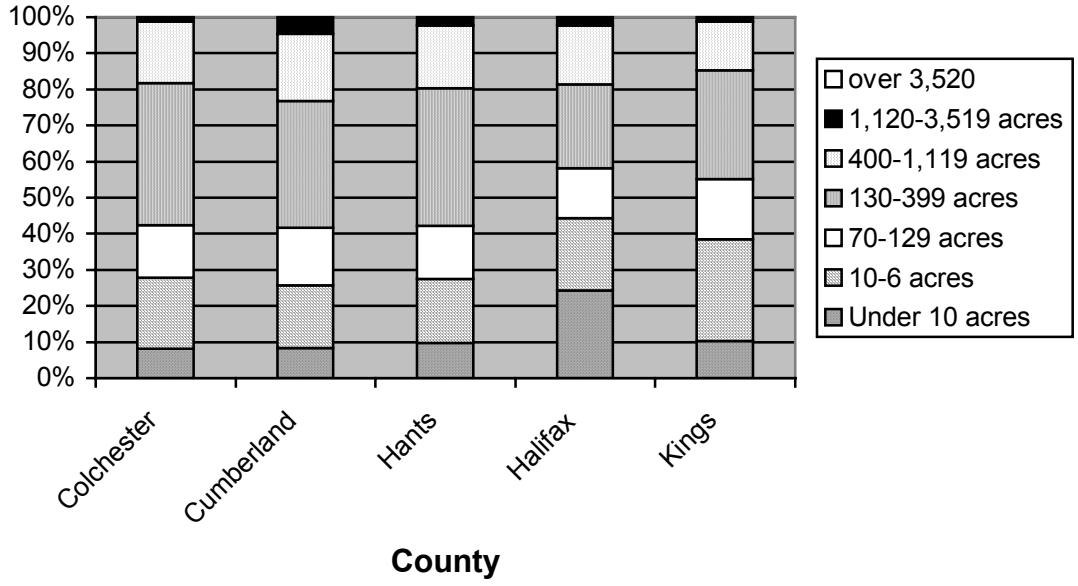
The majority of the farms in the Minas Basin watershed are less than 400 acres with most being between 130-399 acres as illustrated in Table 25 and Figure 27.

Table 25
Size of Farms for Counties in the Minas Basin watershed (1996)

County	Total # Farms	Under 10 acres	10-69 acres	70-129 acres	130-399 acres	400-1,119 acres	1,120-3,519 acres	Over 3,520 acres
Colchester	538	44	106	78	212	91	6	1
Cumberland	556	46	96	89	194	103	26	2
Hants	393	38	70	58	150	68	9	0
Halifax	210	51	42	29	49	34	5	0
Kings	707	73	199	118	213	95	9	0
Total	**2,404**	**252**	**513**	**372**	**818**	**391**	**55**	**3**
NS	**4,453**	**459**	**898**	**727**	**1596**	**688**	**80**	**5**

Source: (Statistics Canada, 1997b)

Figure 27
Percentage of Farms by Size in counties of the Minas Bain watershed (1996)



Source: (Statistics Canada, 1997b)

7.4.5 Farm Land Use

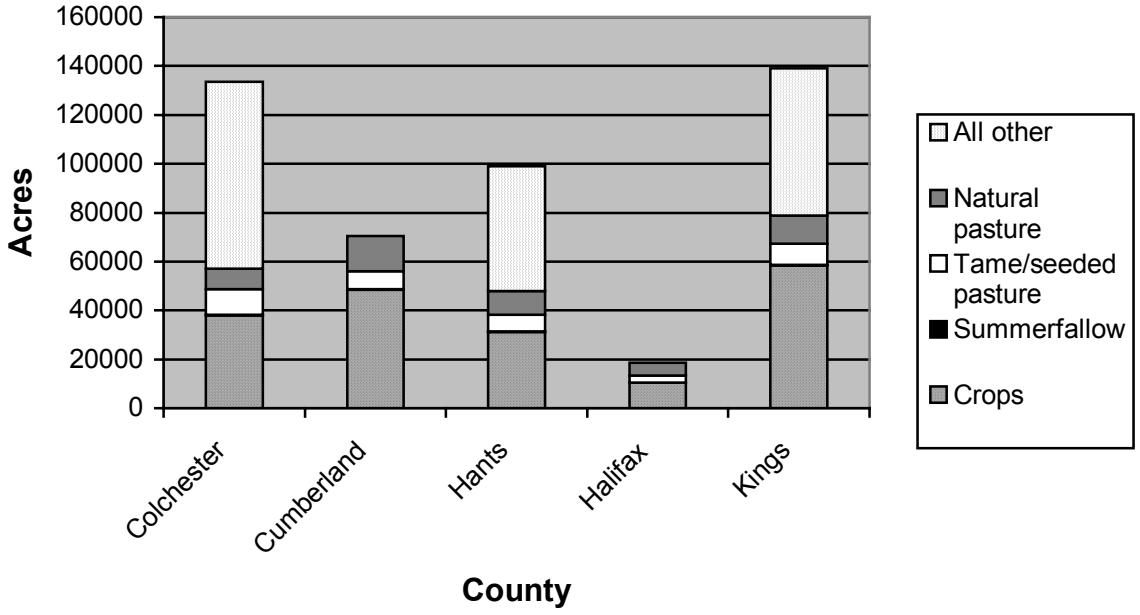
As previously mentioned, a large portion of Nova Scotia's farmland lies in the Minas Basin watershed. The majority of this farmland is used for "crops" or other, undefined uses as Table 26 and Figure 28 illustrate.

Table 26
Farm Land Area Classified by Use of Land for Counties in the Minas Basin watershed (1996)

Location	Land Use					Total Area of farms
	Land in Crops	Summer-fallow	Tame or seeded pasture	Natural land for Pasture	All other*	
Colchester	37,868	365	10,392	8,508	76,431	133,393
Cumberland	48,424	194	7,324	14,460	N/a	181,283
Hants	31,253	181	6,804	9,669	50,988	98,895
Halifax	10,595	N/a	2,859	5,094	N/a	45,441
Kings	58,288	478	8,532	11,419	60,238	138,955
Total	**186,246**	**1,218**	**35,911**	**49,150**	**187,657**	**597,967**
Nova Scotia	**277,658**	**1,431**	**61,788**	**91,323**	**623,741**	**1,055,941**

**Includes Christmas tree areas*
Source: (Statistics Canada, 1997b)

Figure 28
Farm Land Area Classified by Use of Land for Counties in the Minas Basin watershed (1996)



Source: (Statistics Canada, 1997b)

7.4.6 Major Crops

The major crops grown in the counties of the Minas Basin watershed are a diverse array of field crops, fruit trees, berries and vegetables.

Field Crops grown:

Large Amount of Crops Grown:

Spring and Winter Wheat
(Kings)
Oats
Barley
Corn for Grain (Kings and Hants)
Corn for Silage
Alfalfa and Alfalfa mixtures
Other tame Hay and Fodder Crops
Potatoes (Kings)

Small Amount of Crop Grown:

Mixed Grains
Rye (Kings)
Buckwheat
Soybeans
Dry Field Beans (Kings and Hants)
Source: (Statistics Canada, 1997b)

Tree Fruits and Nuts:

Counties located in the Minas Basin watershed contain approximately 90% of the land dedicated to tree fruit and nut production in Nova Scotia, and 91 % of the number of trees grown. Most of these are grown in Kings County (95%). See Table 27.

Types of Tree Fruits and Nuts Grown:

Apples (Kings)
Pears (Kings)
Plums and Prunes
(Kings, some Cumberland)
Sweet Cherries (Kings)
Peaches
Sour Cherries (Kings)
Apricots Source: (Statistics Canada, 1997b)

Table 27
Total Tree Fruits and Nuts Grown for Sale for Counties in the Minas Basin watershed (1996)

County	Farms Reporting	Acres	Number of Trees
Colchester	6	10	294
Cumberland	8	14	197
Hants	22	310	60,374
Halifax	7	32	3,775
Kings	213	7,467	1,132,301
Total	**256**	**7,833**	**1,196,941**
Nova Scotia	**346**	**8,656**	**1,315,165**

Source: (Statistics Canada, 1997b)

Berries and Grapes:

The counties located in the Minas Basin watershed grow approximately 80% of the berries and grapes in Nova Scotia. The majority of Nova Scotia's berry harvest is for blueberries (95% under cultivation and 93% for harvest). Since most of Nova Scotia's blueberry harvest occurs in Cumberland County (60%) and only 14% of Cumberland County is in the watershed, these numbers can be deceiving. The actual amount of berries and grapes grown for sale in the Minas Basin watershed is likely significantly less than 80%. See Table 28.

Types of Berries and Grapes Grown:
Strawberries (Kings)
Raspberries (Kings)
Blueberries (Cumberland, Colchester, Hants)
Grapes (Kings)
Cranberries (Kings)
Source: (Statistics Canada, 1997b)

Table 28
Berries and Grapes Grown For Sale for Counties in the Minas Basin watershed (1996)

County	Under Cultivation		For Harvest		Total Acres
	Farms Reporting	Acres	Farms Reporting	Acres	
Colchester	170	4,879	154	2,400	7,279
Cumberland	303	17,118	283	9,873	26,991
Hants	38	1,365	36	734	2,099
Halifax	26	1,177	23	586	1,763
Kings	109	740	106	561	1,301
Total	**646**	**25,279**	**602**	**14,154**	**39,433**
Nova Scotia	**910**	**31,766**	**845**	**17,561**	**49,327**

Source: (Statistics Canada, 1997b)

Vegetables:

Eighty-six percent of the vegetables grown for sale in Nova Scotia are from the counties in the Minas Basin watershed; however, the large majority of those (80%) were grown in Kings County. See Table 29.

Types of Vegetables Grown:
Large Amounts:
Sweet Corn
Tomatoes
Cucumbers and gherkins
Green Peas
Green or Wax Beans
Cabbage
Cauliflower
Broccoli
Carrots
Rutabagas
Beets
Dry Onions
Lettuce
Spinach
Peppers
Squash, Pumpkins and Zucchini
Asparagus
Rhubarb
Source: (Statistics Canada, 1997b)

Small Amounts:
Green Onions and shallots
Celery
Brussels Sprouts
Chinese Cabbage
Radishes
Source: (Statistics Canada, 1997b)

Table 29
Area of Vegetables (excluding Greenhouse Vegetables)
for Counties located in the Minas Basin watershed (1996)

County	Farms Reporting	Acres
Colchester	36	658
Cumberland	25	612
Hants	59	244
Halifax	17	56
Kings	183	6,197
Total	**320**	**7,767**
Nova Scotia	**493**	**9,012**

Source: (Statistics Canada, 1997b)

7.4.7 Livestock

A large percentage of the livestock raised in Nova Scotia occurs in the Minas Basin watershed. Almost three quarters of the chickens and pigs are raised in the counties located in the Minas Basin watershed: the vast majority in Kings County. A good percentage of the cattle are also raised here with the majority in Colchester, Hants and Kings Counties. Other livestock raised in these counties include horses, goats, rabbits, mink, fox, llamas and alpacas. See Table 30 for details.

Table 30
Livestock Inventory for Counties in the Minas Basin watershed (1996)

Livestock	Colchester	Cumberland	Hants	Halifax	Kings	Total	NS	% NS
Cattle/calves	20,303	16,664	16,935	5,100	21,534	**80,536**	128,971	**62%**
Chicken & Hens	42,476	32,106	152,573	73,324	2,486,512	**2,786,991**	3,558,559	**78%**
Pigs	7,442	11,314	6,544	165	71,956	**97,421**	130,707	**75%**
Sheep & Lambs	3,561	4,507	2,216	293	2,091	**12,668**	23,506	**54%**
Bee Colonies	1,486	448	682	24	3,117	**5,757**	6,808	**85%**

Source: (Statistics Canada, 1997b)

7.4.8 Farm Land Management

Table 31 illustrates a significant amount of farmland in the Minas Basin area is being "artificially" managed through the application of commercial fertilizer: For example, 23% of farmland in Colchester County, and 35% of farmland in Kings County. Irrigation is primarily used on farms in Kings County (about 3% of farmland) where a majority of fruits and vegetables are grown. As well, Kings County has the greatest percentage of herbicides, insecticides and fungicides used of counties located in the Minas Basin watershed: on 20%, 12% and 12% of farmland respectively. This could be a result of the types of crops grown in Kings County. See Table 31 for more detailed information. Many farms are also practicing soil conservation methods such as crop rotation and strip-

cropping. Table 32 and Figure 29 show detailed information on the number of farms employing soil conservation practices in each county.

Table 31
Use of irrigation, Commercial Fertilizer, Herbicides, Insecticides, Fungicides and Manure Application for Counties in the Minas Basin watershed (1996)

	Acres							
	Total Farmland	Irrigation	Commercial Fertilizer	Herbicides	Insecticides	Fungicides	Surface Manure Application -Solid Spreader	Surface Manure Application - Liquid Spreader
Colchester	133,393	162	31,630	7,277	2,147	1,879	242	3,954
Cumberland	181,283	263	27,063	11,489	5,368	5,198	216	1,867
Halifax	45,441	40	8,831	1,362	245	95	94	1,115
Hants	98,895	86	25,341	3,056	794	942	252	4,411
Kings	138,955	3,956	49,564	28,884	17,310	16,891	368	7,757
Total	**597,967**	**4,507**	**142,429**	**52,068**	**25,864**	**25,005**	**1,172**	**19,104**
Nova Scotia	1,055,941	5,532	218,817	65,782	28,832	27,058	82,814	29,162

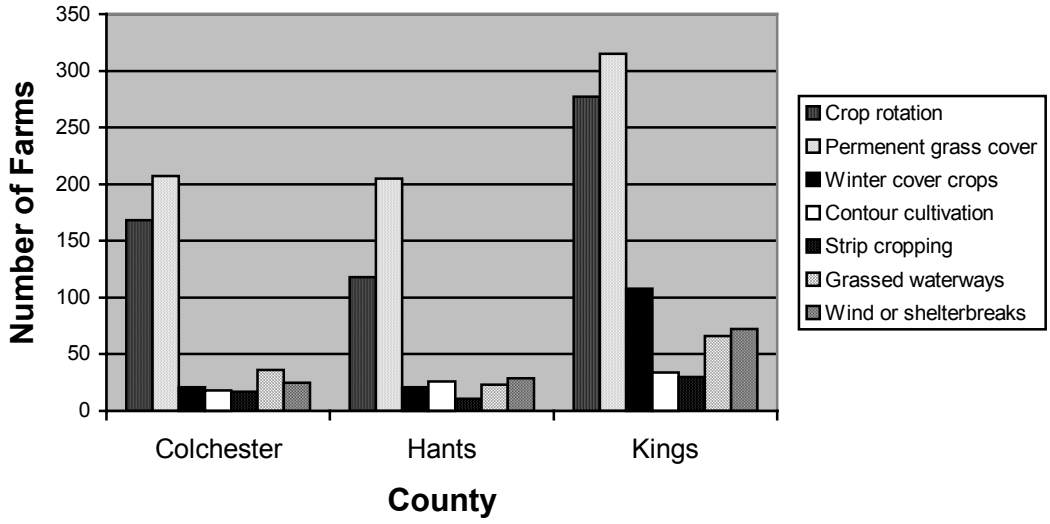
Source: (Statistics Canada, 1997b)

Table 32
Number of Farms Reporting Soil Conservation Practices for Counties in Minas Basin watershed (1996)

	Total No. Farms	Crop Rotation	Permanent Grass Cover	Winter Cover Crops	Contour Cultivation	Strip-cropping	Grassed waterways	Windbreaks/ Shelterbelts
Colchester	538	168	207	21	18	17	36	25
Cumberland	556	223	152	18	13	10	25	28
Halifax	210	48	81	9	6	1	6	8
Hants	393	118	205	21	26	11	23	29
Kings	707	277	315	108	34	30	66	72
Total	**2,404**	**834**	**960**	**177**	**97**	**69**	**156**	**162**
Nova Scotia	4,453	1,310	1,681	253	157	121	240	267

Source: (Statistics Canada, 1997b)

Figure 29
Number of Farms Reporting Soil Conservation Practices for Counties in Minas Basin watershed (1996)



Source: (Statistics Canada, 1997b)

7.4.9 Farm Capital, Receipts, and Expenses

The counties in the Minas Basin watershed combine to produce over 50% of Nova Scotia's total farm capital (See Figure 32). The majority of capital is from Kings County at 23%. Table 33 also illustrates farm receipts and operating expenses for the counties in the Minas Basin watershed.

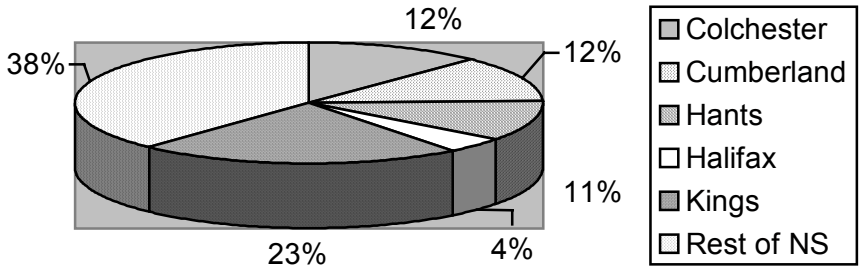
Table 33
Total Farm Capital, Total Gross Receipts and Total Operating Expenses for Counties in the Minas Basin watershed (1996)

	Colchester	Cumberland	Hants	Halifax	Kings	Minas Basin watershed Total	NS	% NS
Total Farm Capital (Market	166,566,382	166,566,382	146,728,739	56,387,127	307,223,642	**843,472,272**	1,360,035,456	**62%**

value $)								
Total Gross Farm Receipts ($)	42,924,150	40,564,527	39,912,168	15,196,469	132,449,162	**271,046,476**	384,333,174	**70%**
Total Operating Expenses ($)	34,900,751	34,173,164	32,551,640	12,407,616	116,641,057	**230,674,228**	327,512,644	**70%**

Source: (Statistics Canada, 1997b)

Figure 29
Total Farm Capital for Nova Scotia Counties (1996)



Source: (Statistics Canada, 1997b)

7.5 FORESTRY

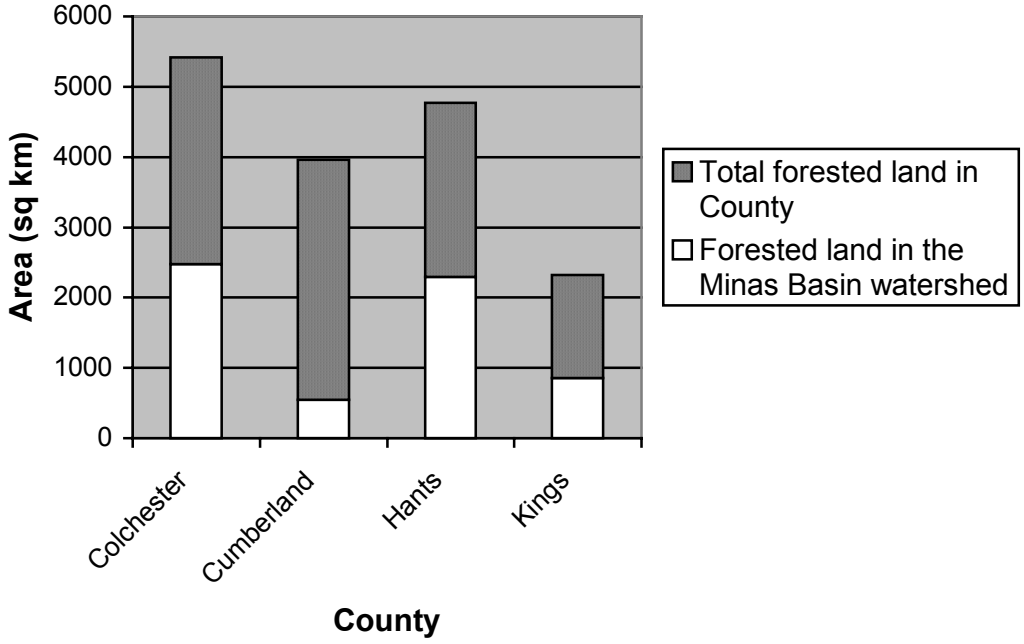
As previously discussed in section 5.0, much of the land in the Minas Basin watershed is forested (See Map 10). As a result, there is a large forest industry throughout the Minas Basin watershed. Like agricultural statistics, forestry statistics are available by county only. It is important to remember that large portions of the counties are not in the watershed. Table 34 and Figure 31 summarize the amount of forested land in the Minas Basin watershed for each county and compare it to the total area of forested land in each county. The forestry data below will therefore not give an accurate reflection of forestry activity specific to the Minas Basin watershed.

Table 34
Forested Land by County in the Minas Basin watershed

County	Forested area in the Minas Basin watershed (sq km)*	Total forested area in County
Colchester	2,478.00	2,939.77
Cumberland	524.20	3,420.82
Hants	2,294.90	2,478.99
Kings	852.90	1,466.94
Total	**6149.80**	**10,306.52**

Source: **Approximate values – calculated by Jennifer Hackett, DFO Coastal and Oceans Management Division*; Nova Scotia Department of Natural Resources 2001c

Figure 31
Forested Land by County in the Minas Basin watershed

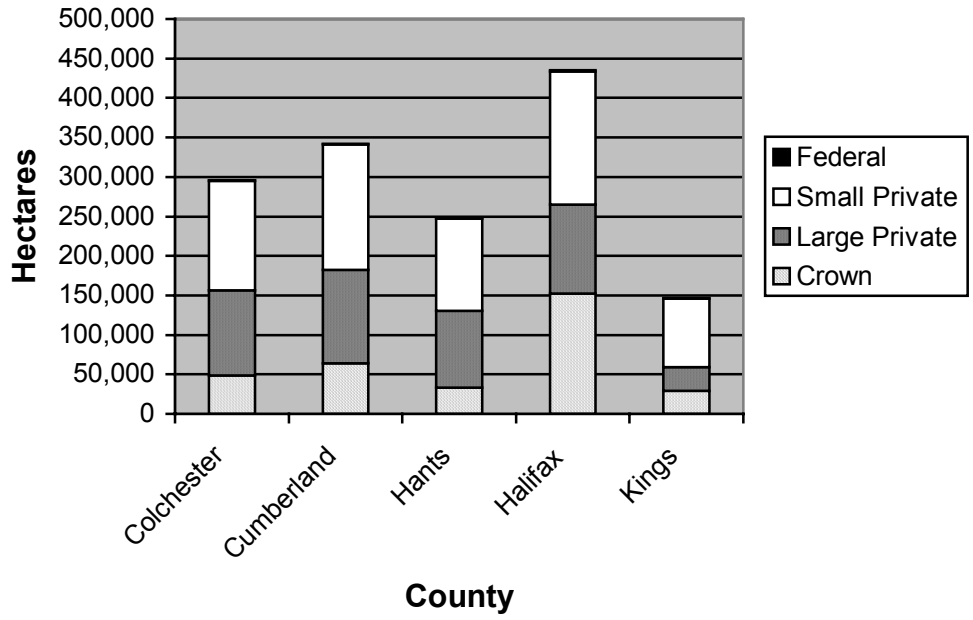


Source: Approximate values – calculated by Jennifer Hackett, DFO Coastal and Oceans Management Division; Nova Scotia Department of Natural Resources 2001c)

7.5.1 Ownership of forested land

There is a high ratio of private to crown forested land ownership in Nova Scotia. Approximately 75% of forest land in Nova Scotia is privately owned and most are in small holdings of 1000 acres or less (KCED, 1998; Nova Scotia Department of Development, 1986). Except in PEI, nowhere else in Canada will you find such a high percentage of forest resources owned by the private sector. Similarly, much of the forested lands in the counties located in the Minas Basin watershed are privately owned. Figure 32 illustrate this point and APPENDIX J contains more specific data on forestland ownership.

Figure 32
Forest Land by Ownership for Counties in the Minas Basin watershed (2000)



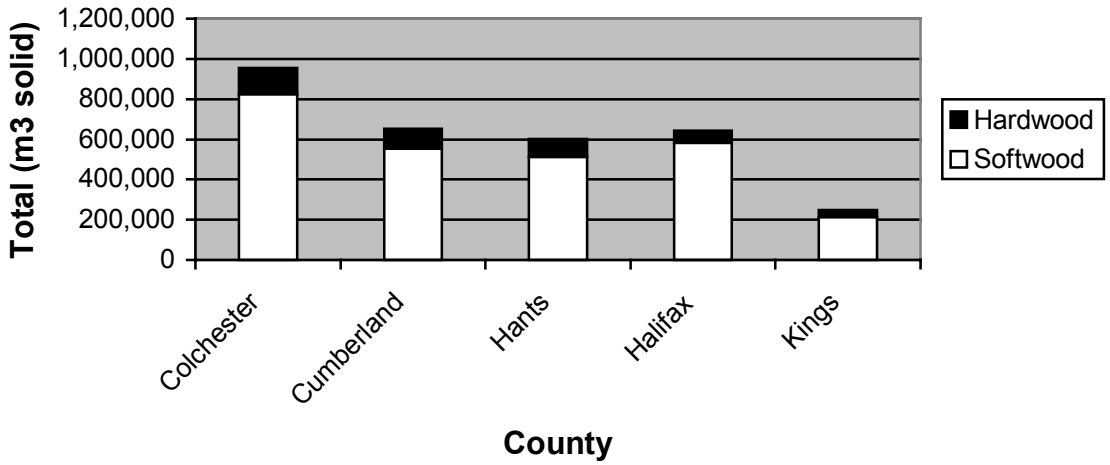
Source: (Nova Scotia Department of Natural Resources, 2001c)

7.5.2 Industry

The forestry sector contributes greatly to the economy of Nova Scotia and to the counties in the Minas Basin watershed. Harvest is primarily for softwood since the forests are comprised primarily of softwood species. Softwood products include: saw logs, pulpwood, lumber and cull. Hardwood products include: saw logs, bolt woods, pulpwood, firewood and cull. There is only one pulp mill in the watershed and it is located in Hantsport. Other industries related to forestry are listed in APPENDIX L.

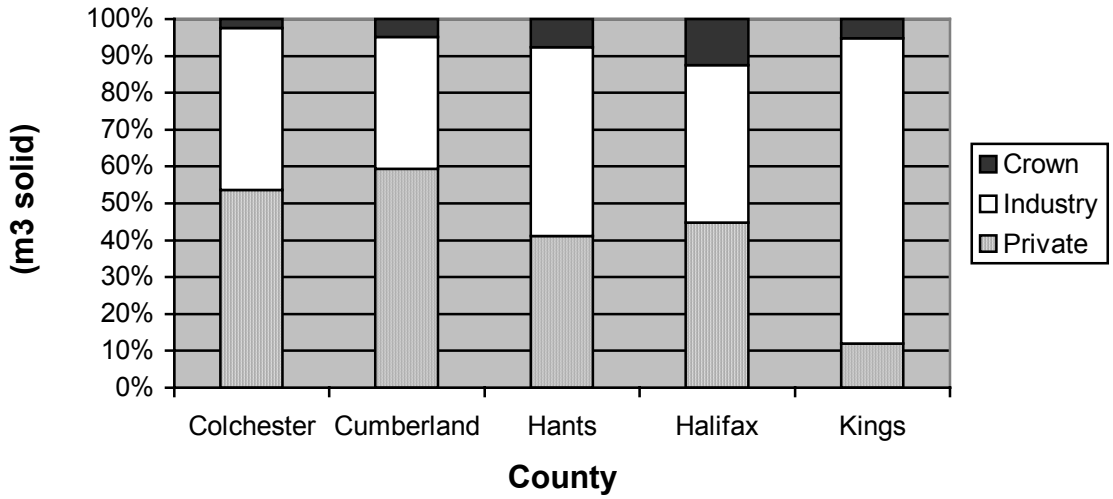
The most intensive forest harvest in the province occurs away from the coastal areas. Harvesting of forests however, greatly affects the marine environment wherever it occurs in the watershed. Within the Minas Basin watershed, Colchester, Cumberland and Hants Counties are very active in the forestry sector, and Kings County is the least active. Colchester leads the province in total forest production with 16% of NS softwood and 11.6% NS hardwood, a total of 15.6% of total forest production for Nova Scotia (See Figure 33) (MacNutt, date unknown). Forest harvest from private land makes up about 80% of the total provincial harvest (KCED, 1998). Refer to Figure 34 and APPENDIX K for detailed information. The total forest harvest for all counties in the Minas Basin watershed (excluding Lunenburg and Pictou) is 2,459,862 m3 solid. See Figure 33 for individual county information.

Figure 33
Quantity of Softwood/Hardwood Forest Harvest by Counties in the Minas Basin watershed (2000)



Source: (Nova Scotia Department of Natural Resources, 2001c)

Figure 34
Ownership of Forest Harvest for Counties in the Minas Basin watershed (2000)

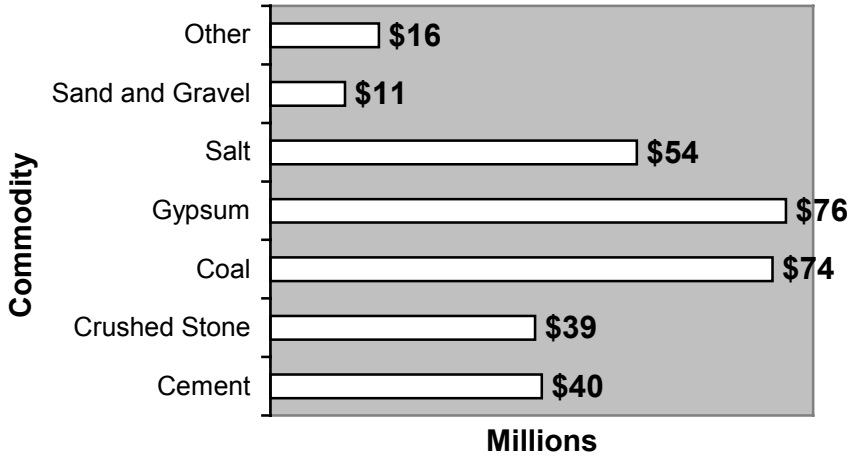


Source: (Nova Scotia Deprtment of Natural Resources, 2001c)

7.6 MINING

In the year 2000, Nova Scotia's estimated value of mineral production including secondary mineral processing totalled $310 million (Nova Scotia Department of Natural Resources, July 2001). See Figure 35 for an illustration of Nova Scotia's Mineral Production. A large volume of this amount comes from coal production in other parts of the province, not in the Minas Basin watershed. However, several of the counties located in the Minas Basin watershed are very active in mining, primarily in the production of industrial minerals such as gypsum and crushed stone. Table 35 compares mineral production by county. APPENDIX L also lists some of the mining industries located in the Minas Basin watershed.

Figure 35
Distribution of Nova Scotia's Mineral Production by Commodity (2000)



Source: (Nova Scotia Department of Natural Resources, July 2001)

Table 35
Nova Scotia Mineral Production by County (1999)

County	*Production (millions)*
Colchester	$40
Cumberland	$52
Halifax	$57
Hants	$31

Source: (Nova Scotia Department of Natural Resources, July 2001)

7.6.1 Current Mining Activity

In the Minas Basin watershed area, most of the mineral production is for industrial minerals. Industrial minerals are a group of common minerals commodities used in industry and manufacturing. Aggregates (crushed stone, sand and gravel), building stone (granite, sandstone and marble) and clay and shale are primarily used in building and construction work (Nova Scotia Department of Natural Resources, date unknown). Other industrial minerals such as barite, dolomite, limestone, salt, silica sand, peat moss, gypsum and anhydrite have a variety of uses (Nova Scotia Department of Natural Resources, July 2001).

There are 11 active mines in the Minas Basin watershed. They are all for Industrial minerals and they are all surface mines. See Map 17 and Table 36 for locations and descriptions.

Table 36
Active Mines in the Minas Basin watershed (2001)

Commodity	*Mining Company and Location*
Anhydrite	Fundy Gypsum Company, Windsor, Hants County*
Barite	E-Z-EM Canada Incorporated, Nystone Division, Brookfield, Colchester County*
Clay and Shale	Shaw Brick, Lantz and Shubenacadie, Colchester County (clay)* Shaw Brick, Milford (shale)*
Gypsum	Fundy Gypsum Company, Windsor, Hants County* National Gypsum (Canada) Limited, Milford Station*
Limestone	Lafarge Canada Incorporated, Brookfield, Colchester County*
Peat Moss	Annapolis Valley Peat Moss Company Limited, Berwick, Kings County* Macdonald Peat Moss Ltd., Riverside Corner, Hants County*
Silica Sand	Shaw Resources, Shubenacadie*
Stone	Scotia Slate Products, East Gore, Hants County*
Sand and Gravel	Shaw Resources (Keddy Aggregate Operation), Coldbrook, Kings County* Lafarge Construction Materials, Folly Lake, Colchester County*

*Surface Mines

Source: (Nova Scotia Department of Natural Resources, March 2001)

Gypsum and Anhydrite

In the Minas Basin watershed the largest value of mineral production comes from gypsum production with 7.2 million tonnes being shipped from Nova Scotia in 2001. Nova Scotia is not only Canada's largest gypsum producer, accounting for more than 80% of the country's total production, but also the largest gypsum-mining region in the world (Nova Scotia Natural Resources, 2001 and date unknown). Gypsum productions are located near Windsor in Hants County.

Aggregates

Production of construction aggregates, crushed stone, sand and gravel, occur primarily in Colchester, Hants and Kings Counties. Aggregates are used to make concrete, in road and highway constructions and other construction projects (Nova Scotia Natural Resources, 1998). Table 37 details the area occupied by gravel pits by county for the year 1998)

Table 37
Area of Gravel Pits in Counties of the Minas Basin watershed

County	Area of Gravel Pit (hectares)
Colchester	945
Cumberland	0
Hants	846
Halifax	1,262
Kings	430
Total	**3,483**

Source: (Nova Scotia Department of Natural Resources, 1998)

Clay and Shale

Almost all shale and clay mined in Nova Scotia is used to manufacture building brick. In the year 2000, almost 30,000 tons of clay and shale were produced from clay pits in Hants County, and shale quarries in Hants and Pictou counties to meet the needs of a major brickyard in Lantz (Nova Scotia Department of Natural Resources, 1998).

Building Stone

The only building stone mined in the Minas Basin watershed is being produced in East Hants.

Silica Sand

Most of the production from silica sand deposits in central Nova Scotia is marketed as industrial sand even though it's quality is good enough to be used in the manufacturing of glass containers and fibreglass insulation (Nova Scotia Natural Resources, date unknown.

Barite
Barite in its pure form is used pharmaceutically in the taking of stomach and intestinal x-rays. The principal industrial use of barite is as a weighing agent added to the lubricating mud used in oil well drilling to help prevent "blowouts" caused by pressures encountered in oil or gas bearing formations (Nova Scotia Department of Natural Resources, date unknown).

Peat Moss
Nova Scotia has approximately 161,810 hectares of peat land with approximately 10,300 hectares of that in central Nova Scotia (Nova Scotia Department of Development, 1986). The majority of the resources are concentrated in a small number of regions and two are in Hants and Kings Counties (Anderson, 1993). Hants County is estimated to have 5,800 hectares of peat land of which 2,300 hectares have been assessed for harvest potential. The peat lands in this area are predominately large, well-defined, raised bog complexes with very thick layers of moss grade peat (Anderson 1993). The peat deposits of Kings County are generally found in the southwestern portion of the County but the most economic deposits are found between Kentville and Kingston (Anderson, 1993). One deposit is currently being mined and others have been partially drained and used for vegetable production (Nova Scotia Department of Natural Resources, date unknown).

There is currently only one active peat moss producer in the Minas Basin watershed: Annapolis Valley Peat Moss Company Limited. Current peat moss production totals approximately 200,000 bales annually. Products being made include compressed peat moss, soil mixes and grow-in-bags. Most peat moss is exported to Japan and the United States (Nova Scotia Department of Natural Resources, 1998).

7.6.2 Past Mining Activity

Industrial Minerals
Gypsum – Cheverie, Hants County
Barite – Walton, Hants County; Five Islands, Colchester County

Structural Materials and Building Stone
Clay, Shale – Avonport, Kings County
(Nova Scotia Department of Development, 1986)

7.6.3 Exploration
Mineral exploration in Nova Scotia is primarily by junior mining companies searching for industrial mineral commodities such as kaolin, silica and titanium. The total area under exploration licence in Nova Scotia, including special licences at the end of 2000 was approximately 157,000 hectares (Nova Scotia Department of Natural Resources, July 2001).

There are several large exploration licence holders in the Minas Basin watershed. One of the largest licences is held by the Titanium Corporation Inc. for an area near the mouth of the Shubenacadie River. The Titanium Corporation refers to this project as the "Nova

Scotia Mineral Sands Project". For this location, they have calculated resources at 331 million tonnes, with an average grade of 1.94% of heavy minerals and a projected mine life of 15 years (Titanium Corporation, 2003). Exploration results have indicated substantial deposits of rutile, limonite, zircon, iron and other heavy minerals indicative of the presence of titanium.

Other Major licence holdings include True Metallic Explorations Corporation west of Windsor; Votix Corporation Limited in central Hants County; Monster Copper Resources Inc. north west of Truro and near Five Islands; Martin W. Roche in Cobequid Bay; and Michael H. Kuryluk west of Parrsboro (Fisher and Wenning, 2000). Detailed information on Licence Holdings in Nova Scotia can be obtained from the Nova Scotia Department of Natural Resources, Minerals and Energy Branch.

7.6.4 Seabed Mining

There is currently no seabed mining permitted in Canada, but an area in the Minas Channel near Scot's Bay has been recognized as having good potential for gravel extraction.

7. 7 HUNTING AND TRAPPING

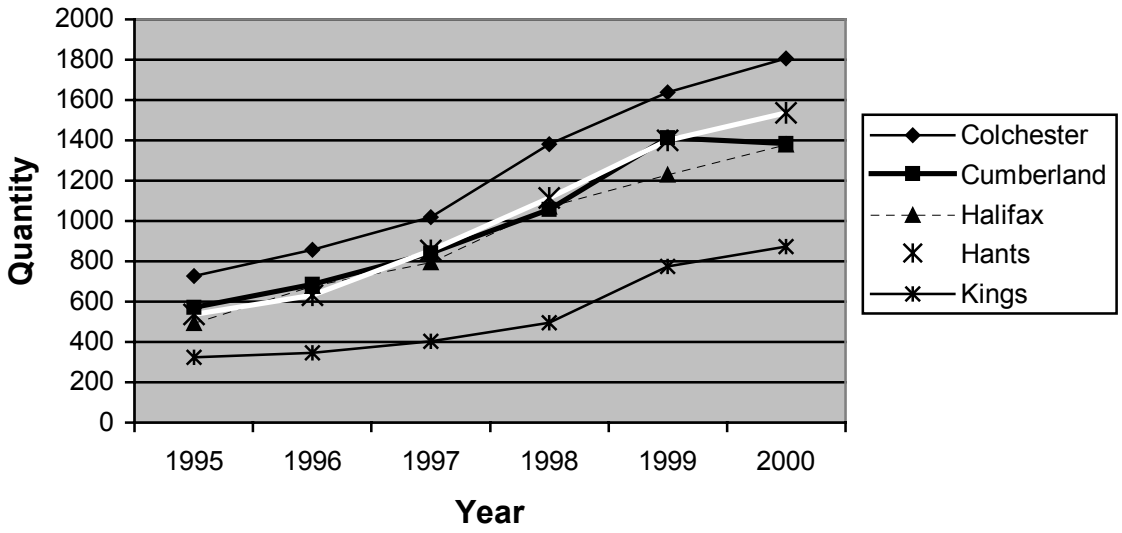
The landscape of the Minas Basin watershed varies from natural forested land to highly managed areas of human development including agricultural and urban landscapes. Therefore, it is understandable that the wildlife in the watershed will vary considerably by geographic location and so will the hunting and trapping that goes on. This is verified by the data in Tables 38-40 and Figures 36-38. They show counties with greater amounts of natural area have higher harvest numbers, especially for large animals. Counties such as Kings, which have large amounts of agricultural land, have greater numbers of small animal harvest including pheasants.

Table 38
Number of Large Mammals Harvested in Nova Scotia

Animal	Licences (2000)	Harvest 1999	Harvest 2000
Bear	498	N/a	264
Moose	N/a	N/a	190
Deer	53,060	15,818	17,179

Source: (Department of Nova Scotia Natural Resources, 2001b)

Figure 36
Deer Harvest Summary for Counties in the Minas Basin watershed



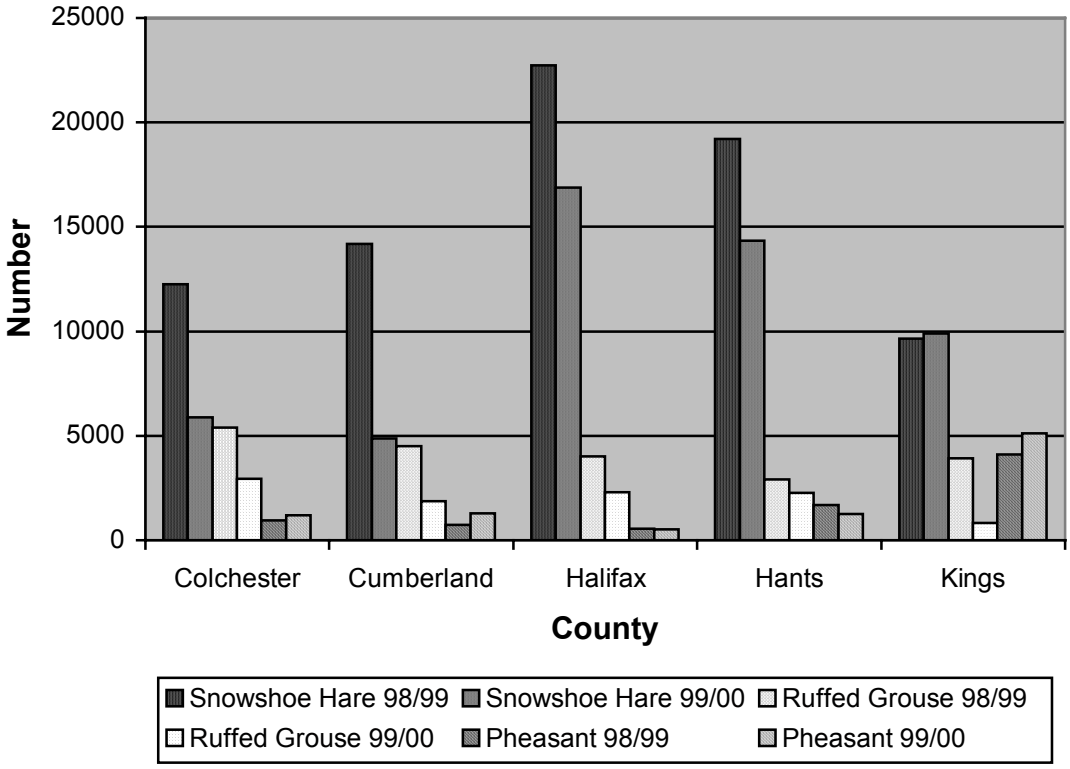
Source: (Department of Nova Scotia Natural Resources, 2001b)

Table 39
Upland Game Harvest for Counties in the Minas Basin watershed

County	Snowshoe Hare		Ruffed Grouse		Pheasant	
	98/99	99/00	98/99	99/00	98/99	99/00
Colchester	12,251	5,886	5,392	2,943	942	1,183
Cumberland	14,171	4,885	4,511	1,881	744	1,274
Halifax	22,725	16,869	4,025	2,306	547	516
Hants	19,218	14,351	2,916	2,276	1,686	1,244
Kings	9,644	9,891	3,919	819	4,116	5,127
Total	**78,009**	**51,882**	**20,763**	**10,225**	**8,035**	**9,314**
% NS	**27%**	**34%**	**37%**	**35%**	**62%**	**77%**
Nova Scotia	**286,204**	**152,944**	**55,519**	**29,098**	**13,033**	**12,075**

Source: (Department of Nova Scotia Natural Resources, 2001b)

Figure 37
Upland Game Harvest for Counties in the Minas Basin watershed



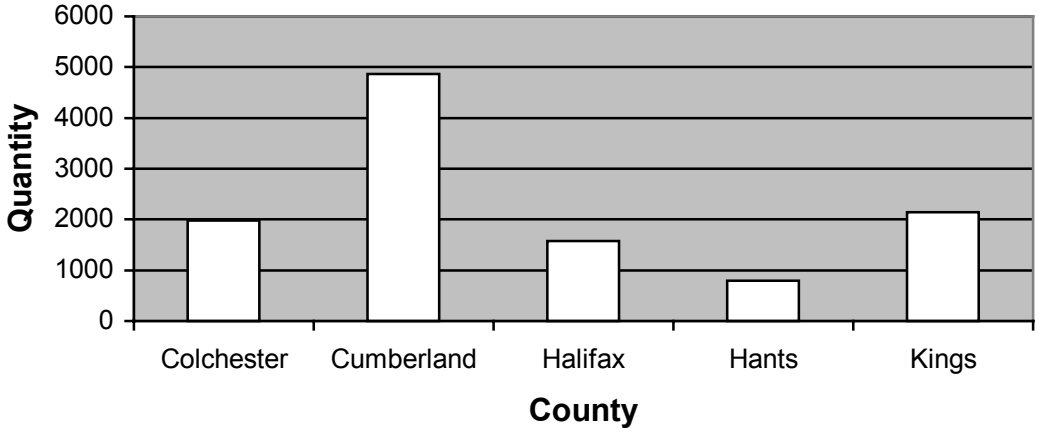
Source: (Department of Nova Scotia Natural Resources, 2001b)

Table 40
Fur Harvest for Counties in the Minas Basin watershed (2000)

County	Harvest
Colchester	1,985
Cumberland	4,864
Halifax	1,581
Hants	792
Kings	2,138
Total	**11,360**
% Nova Scotia	**43%**
Nova Scotia	**26,154**

(Furs harvested include: Beaver, M muskrat, Otter, Mink, Bobcat, Fox, Racoon, Skunk, Squirrel, Weasel, Coyote, Lynx and Fisher)
Source: (Department of Nova Scotia Natural Resources, 2001b)

Figure 38
Fur Harvest for Counties in the Minas Basin watershed (2000)



Source: (Nova Scotia Department of Natural Resources, 2001b)

8.0 OTHER ACTIVITIES/LAND USES

8.1 MANUFACTURING AND INDUSTRY

In 1991, over 45,000 people were employed in the manufacturing sector in Nova Scotia. This represented approximately 11% of the employed labour force. Over 23% of the employment in this sector was attributed to the production of food and beverages (Nova Scotia Department of Finance, November 2000).

There are 1,888 manufacturing establishments in Novas Scotia, 45 of which employ in excess of 200 people (Nova Scotia Department of Finance, 2001-2002). One of the largest employers in the manufacturing sector is Michelin Tires, which has a location in Kings County. Small, individually owned manufacturers are also vital to the Nova Scotia economy, especially in the less populated regions because of the employment they provide for local residents.

There is a substantial amount of manufacturing occurring in the Minas Basin watershed. Much of it is supporting resource industries such as forestry and agriculture. Therefore, the locations of natural resources have a strong bearing on the location and types of major manufacturing activities carried out. Other goods that are produced in the watershed include tires, carpets, textiles, industrial chemicals, and building supplies. Table 41 and Figure 39 show the number of manufacturing plants and employees by county, Table 42 lists some of the largest manufacturers in the Minas Basin watershed and Figure 40 illustrates employment in manufacturing for each county in the Minas Basin watershed. Lastly, Table 43 lists the major industrial parks found within the Minas Basin watershed.

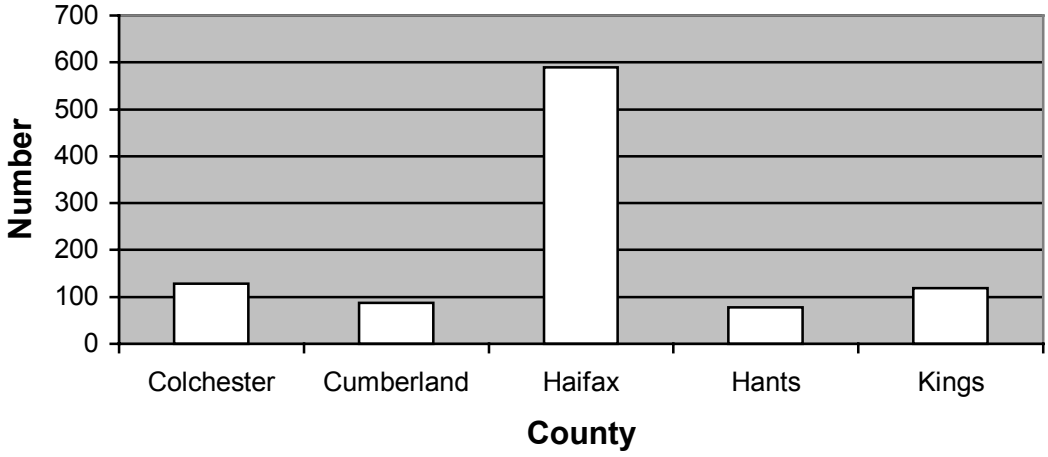
Table 41
Nova Scotia Manufacturers (2001)

	Colchester	Cumberland	Hants	Halifax	Kings	Total	NS

Plants	128	87	78	589	119	**1,001**	**1,888**
Employees	3,451	3,093	1,417	12,149	3,803	**23,913**	**45,677**

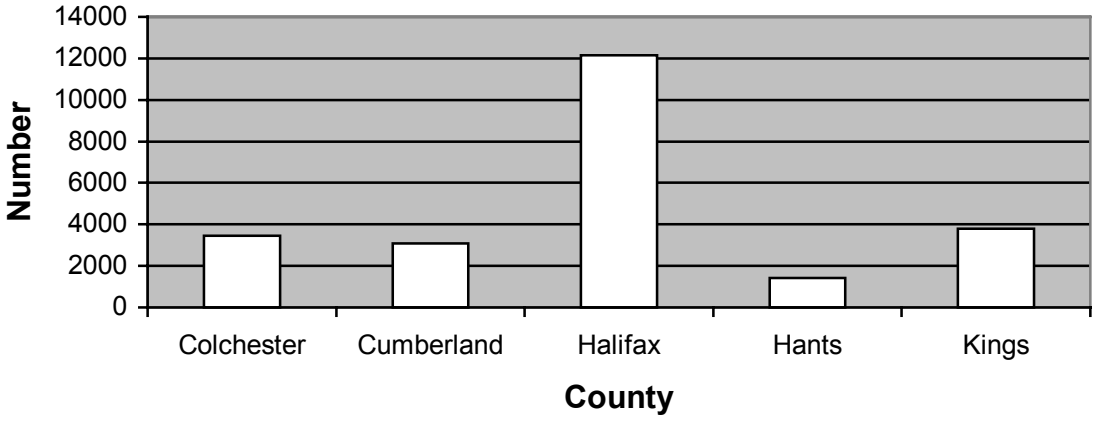
Source: (Nova Scotia Department of Finance, 2001-2002)

Figure 39
Number of Manufacturing Plants in Counties of the Minas Basin watershed (2001)



Source: (Nova Scotia Department of Finance, 2001-2002)

Figure 40
Number of Persons employed in Manufacturing for Counties in the Minas Basin watershed (2001)



Source: (Nova Scotia Department of Finance, 2001-2002)

Manufacturing - County Profile

Colchester: Forestry and agriculture are still vital components of the economy in Colchester County. The agricultural supply industry and the Nova Scotia Agricultural College have provided stable employment for Colchester County but manufacturing and service sectors are now the dominant employers and producers (MacNutt, date unknown;

The Canadian Institute for Regional Development, 1997). Food and wood production have the largest number of manufacturing plants in Colchester (MacNutt, date unknown). The largest employers in the county are located in the Truro and Debert Industrial parks. They include textile and clothing manufacturing, an automotive parts manufacturer, a window plant and several distribution centres (The Canadian Institute for Regional Development, 1997).

Cumberland: Food production is the primary source of manufacturing in the county and most likely remains so for the portion of the county in the Minas Basin watershed. The largest manufacturers are a seasonal Oxford Frozen Foods plant in Parrsboro and Parrsboro Metal Fabrication Ltd., a boiler and furnace maker (The Canadian Institute for Regional Development, 1997). Wood production is also a major employer and there are a fair number of plants in the area.

Hants*:* In 1996, the manufacturing sector in Hants County employed 1,356 people, or 7.6% of its employed labour force. Manufacturing businesses in Hants county comprise 4.2% of the Nova Scotia total and they employ 3% of the provincial manufacturing employees. The majority of employees work for three companies but 55% of the manufacturing businesses in the county employ fewer than 5 employees. The Pulp and Paper products sector employs the most people in Hants, even though there are only 3 plants. Clothing and wood production also comprise a fair number of the manufacturers in this county (Keddy, November 2000).

Halifax: Since the airport is in the Minas Basin watershed, many aerospace manufacturing industries are located there. As well, there is some wood manufacturing within the watershed.

Kings: Food manufacturing and processing facilities to support the agricultural industry have been growing industries in Kings County. Non-resource based manufacturing such as the Michelin Plant in Cambridge are also a major source of manufacturing in the county.

Table 42
Some of the Major Manufacturers in Minas Basin watershed (over 30 employees)

Company
Colchester County
Brookfield Lumber Company Ltd.
Canadian Automotive Radiator Exchange & Mgr. Ltd.
Colchester Community Workshops
Cormier Five Island Clams
Crossley Carpet Mills Limited
Farmers C0-operative Dairy Ltd.
Fundy Textiles and Design Ltd.
Inland Technologies
Intertape Polymer Inc.
Julimar Lumber Co. Ltd.

Company
Kohler International Ltd.
LaFarge Canada Ltd.
Marwood Ltd.
Newmac Manufacturing
Nova Enterprises
Orenda Recip Inc.
Scotsburn Dairy Group
Shur-Gain
Sproule Lumber Ltd.
Stanfields
The Daily News
Cumberland County
Oxford Frozen Foods
Parrsboro Metal Fabricators Ltd.
Hants County
CKF Inc.
Elmsdale Lumber
Heritage Memorials
Minas Basin Pulp and Power Co. Ltd.
Nova Scotia Textiles Ltd.
Russell White Lumber Ltd.
Shaw Resources
The Shaw Group Ltd.
Halifax County
Litton Systems Canada Ltd.
Pratt & Whitney Canada
IMP Group Limited
Lewidge Lumber
Scotian Homes
Kings County
ACA Co-operative Ltd.
Annapolis Valley Peat Moss Company Ltd.
Avon Foods
Eastern Bakeries Ltd.
Eastern Protein Foods
Great Valley Juices Inc.
Hostess Frito-Lay Company
Kentville Publishing
LaFarge Canada Inc. Construction Materials Group
Larsen packers Ltd.
Michelin North American (Canada Inc.)
Sarsfield Foods Ltd.
Sweetripe Drinks Ltd. – Allen's Plant
The Maple Leaf Poultry Company
Weavexx

Company
Webster Farms Ltd.

Sources: Keddy, November 2000; The Canadian Institute for Regional Development, 1997;

Table 43
Industrial Parks in the Minas Basin watershed (1982)

Location
Kentville, Kings County
Windsor, Hants County
Windsor-West Hants, Hants County
East Hants Business Park, Hants County
Milford Industrial Park, Hants County
Parrsboro, Cumberland County
Debert Air, Colchester County
Truro, Colchester County
Aerotech, Halifax County

Source: (Nova Scotia Department of Development, 1986; Keddy, November 2000)

8.2 RECREATION AND TOURISM

Tourism has been an important industry in the Maritimes for many years but increasingly so in recent years. Tourist receipts reached 1.1 billion dollars in 1998 and the total number of visitors to Nova Scotia is on a slow upward trend. Over half of the visitors are from Atlantic Canada and Ontario. There are also many visitors from the New England States and Western Canada (MacNutt, date unknown; Resource Management Associates et al., 1999). Out-of-province visitation is much lower than Nova Scotian's travelling within the province, which accounted for 46% of total receipts in 1996 (Resource Management Associates et al., 1999).

There are seven tourist regions in Nova Scotia. The two that are located in the Minas Basin watershed are the Evangeline Trail and the Glooscap Trail. Tourism revenue in Nova Scotia shows the Fundy Shore as comprising 7% of the total tourism revenue for Nova Scotia (TIANS, date unknown). Tourist trends around the Bay of Fundy indicate a growing attraction to activities and features on or close to the Bay, especially in 1997 and 1998. Data supports an increasing interest in the Bay of Fundy and its natural history. Nature tourism or ecotourism, has been a very fast growing area. Market studies indicate a considerable overlap between nature tourists and tourists visiting the Bay of Fundy (Resource Management Associates et al., 1999).

The "products" the Bay of Fundy offers are the highest tides in the world, and diverse marine and coastal environments. Tourism features of the Minas Basin include coastal scenery including quaint coastal communities, historic sites, and outdoor recreational opportunities. Coastal scenery includes beaches, salt marshes, estuaries, tidal flats, cliffs as well as lighthouses, wharves, and coastal communities. History in the Basin includes

that of shipbuilding, Acadian dyke-lands, and Native cultures. Other tourist features include the fossils near the Parrsboro Shore and Rock Hounding near Cape Split. Bird watching is focussed around the southern bight area where large volumes of migratory birds and coastal hiking trails such as Cape Chignecto and Cape Split. As well, the Bay is within close range to services that provide comfort and security to visitors that more remote and isolated experiences may not (Resource Management Associates et al., 1999).

Major recreational activities in the Minas Basin watershed include:
All Terrain Vehicles – off roading
Fishing
Boating/kayaking/canoeing
Hiking
Fossil Hunting
Rock Hounding
Bird watching
Golf Courses
Swimming

8.3 PROTECTION OF SIGNIFICANT AREAS

Protection of natural areas and special features is closely related to recreation and tourism industries in areas where there is a strong emphasis on nature tourism and nature related activities. Numerous natural areas have been protected as parks or reserves, however the overall percentage of protected areas in the watershed remains fairly low. For example, 2.65% of Kings County is protected in parks and wildlife areas (KCED, 2001). Hants County is only one of four counties in Nova Scotia without a single acre of designated Wilderness Area and just 12% of it is crown land. This is well below the average of 28% crown land province wide. Furthermore, only 168 hectares of the county's 313,050 hectares are protected: a very low 0.05% (Nova Scotia Public Lands Coalition, date unknown). The level of land protection is thought to be inadequate for seven of eight natural regions found in this county. Table 44 summarizes significant areas in the Minas Basin watershed. APPENDIX M lists a more detailed list of significant features and areas in the Minas Basin watershed.

Table 44
Summary of Cultural and Natural Significant Areas in the Minas Basin watershed

Internationally recognized areas:
Southern Bight - RAMSAR designation
Fundy Western Hemisphere Shorebird Reserve (North and South American Agreement)

Nationally Recognized areas:
Boot Island National Wildlife area

Grand Pre National Historic Site
Kentville Migratory Bird Sanctuary
Fort Edward National Historic Site

Provincially Recognized areas:
Crown Lands: total not available
Provincial Parks: 15
Archaeological Sites: 5
Fossil Sites: 3
Special Places: 3
Wilderness Areas: 2
Protected Beaches: 11
Wildlife Management Area: 5
Nature Reserves and Sites of Ecological Significance: 13
Heritage Conservation Districts: 1
Protected Water Supply Areas: 8
Plus many locally recognized sites

Protected Water Resource Areas:
McGee Lake and Mill Brook, Kings County for Town of Kentville
French Mill Brook, Hants County for Town of Falmouth
Mill Lakes and Fall Brook, Hants County for Town of Windsor
Snyde Lake, Hants County for Town of Shubenacadie
St. Andrews River, Colchester County for Town of Stewiacke

Other:
Nova Scotia Nature Trust
The Nova Scotia Nature Trust owns four properties in the Minas Basin watershed, protecting approximately 233 acres of land, which are representative woodlands and salt marshes. They also have 34 Stewardship agreements, which provide various limitations on at least 1,278 acres of land ranging from coastal salt marshes to mixed climax and old growth forests. See APPENDIX B for a complete list of these properties.

Southern Bight (RAMSAR and Bay of Fundy Western Hemisphere Shorebird Reserve designations)
Located immediately northwest of Windsor, it is a macro-tidal environment. The site supports the largest numbers of mixed species of shoreline birds, during fall migration, in all of North America (Nocera, date unknown). The extensive intertidal sand and mudflats and their associated invertebrate fauna also attract large numbers of staging water birds. The area comprises 100 ha of upland; 1,400 ha of salt marsh; 7,800 ha of mud-sand flats; 100 ha of beach; and 15,700 ha of open water (Nocera, date unknown). Boot Island (144 ha) is owned by the Government of Canada and is protected, but much of the salt marsh area is privately owned. Only 3.5 km of shoreline is public land (Nocera, date unknown). A small fishery for flounder occurs in the Bay, as well as

annual harvesting of polycheate worms from the mudflats for the commercial bait business. The area has RAMSAR designation but comprises a portion of the Bay of Fundy Hemisphere Shorebird Reserve under the Western Hemisphere Shorebird Reserve Network.

Nova Scotia Model Forest
This project was established in 1998 as an adjunct to the Fundy Model Forest in New Brunswick. The project area is 458,000 ha in Central Nova Scotia and lies almost entirely in the Minas Basin watershed (See Map 19). It is bordered north to south by Truro and Halifax and west to east by Windsor and Caribou Mines. Land ownership in this area is comprised of Crown land (14%), small private landowners (57%), pulp and lumber companies (28%) and Mi'kmaq and other lands (1%). The partners of the Model Forest project, the Nova forest Alliance, are from many diverse groups and organizations. The vision of the Nova Forest Alliance is to achieve sustainable forest management through a co-operative partnership within the context of Nova Scotia's Acadian forest ecosystems (Nova Forest Alliance, date unknown).

Eastern Habitat Joint Venture (EHJV)
The Eastern Habitat Joint Venture Riparian Management Project started in 1997 with a few pilot projects. This project has worked with livestock producers and to some extent community groups to protect riparian edges throughout the province including the counties around the Bay of Fundy. It is estimated that 1,800 acres of wetlands, salt marsh and streamsides have been protected through the program over the years. See Map 18 for project sites throughout Nova Scotia.

8.4 INFRASTRUCTURE

8.4.1 Transportation
There are many transportation links in the Minas Basin watershed including water, highway, railway and air.

Roads
Road infrastructure is the primary transportation source in this area.

Rail
Canadian National Railways have a main line that goes from Halifax to central Canada and travels through Truro to Amherst (Keddy, November 2000). This line includes passenger service. The Windsor and Hantsport Railway Company operates out of Windsor and transports large volumes of aggregates, gypsum and pulp and paper products (Keddy, November 2000). They also run the Evangeline Express that does tours from Windsor to Wolfville with stops in Hantsport and Grand Pre (Keddy, November 2000).

Air

The Halifax International airport lies within the southern portion of the watershed and there are also small regional airports in Waterville, Kings County and in Debert, Colchester County.

Shipping
Water transport is limited to local traffic, fishery, tourism and recreation. The only international port in the Minas Basin is in Hantsport, which is primarily used for the commercial shipping for gypsum (Keddy, November 2000). Local ports in the Minas Basin include Parrsboro, Advocate Harbour, Halls Harbour, Scott's Bay, Delhaven, Economy, Port Williams and Walton. The only working lighthouse in the Minas Basin is at Cape D'Or (Nova Scotia Department of Development, 1986).

Table 45 shows a breakdown of the land area that many of these infrastructures occupy.

Table 45
Area of Selected Infrastructure in the Counties of the Minas Basin watershed

County	Area (hectares)		
	Roads	**Railways**	**Power lines**
Colchester	5,616	297	1,216
Cumberland	6,286	283	698
Hants	2,439	269	1,060
Halifax	4,217	392	1,648
Kings	2,754	177	403
Total	**21,312**	**1,418**	**5,025**

Source: (Nova Scotia Department of Natural Resources, 2001)

8.4.2 Electricity

Generating Plants in the Minas Basin Watershed:
Kings County:
White Rock
Hell's Gate
Lumdsen
Hollow Bridge
Mehtals

Hants County:
Avon 1
Avon 2
Halifax:
Mill Lake
Sandy Lake
Note: all plants are hydro generating plants
Source: (Nova Scotia Department of Development, 1986)

8.4.3 Solid Waste, Water and Wastewater Facilities

There are 15 water treatment plants in the Minas Basin watershed and 21 wastewater treatment facilities (See Map 20 for their locations). APPENDIX N and O give detailed information on the water and wastewater supply and treatment systems in the Minas Basin watershed.

Water Resources

Water comes from a combination of surface and groundwater resources in Nova Scotia. There are five protected surface water resource areas in the Minas Basin watershed serving several of the major urban communities (See Table 44). The rest of the residents in the watershed rely on groundwater wells for their water supply. Approximately 50% of daily water consumption in Nova Scotia is drawn from lakes and rivers and 50% pumped from groundwater reserves (Groundwater Section, Department of Nova Scotia Environment and Labour, 1967). Some of these resources would be municipal or town water sources with the remainder being private wells. This varies within Nova Scotia, for example, 99% of Valley residents obtain their drinking water from groundwater sources (KCED, 2001). Table 46 lists the water treatment facilities in the watershed.

Canadians are among the highest water users in the world. All sectors, from domestic to agriculture are using excessive amounts of water. In many areas dry wells are being experienced as a result of overdrawing groundwater resources. Farmers are using a large proportion of surface water for irrigation. For example in Kings county, it is estimated that 80% of stream water is taken every summer for irrigation (KCED, 2001).

Table 46
Water Treatment Facilities in the Minas Basin watershed

County	Number of Water Treatment Facilities
Colchester	2
Cumberland	1
Hants	5
Halifax	2
Kings	5
Total	**15**

Wastewater

There are two types of sewage treatment in Nova Scotia; municipal sewage facilities or on-site septic fields (KCED, 2001). Most urban areas in the Minas Basin watershed have municipal wastewater collection systems and treatment facilities. With the exception of Parrsboro and Wolfville, all the urban centres in the Minas Basin watershed now have wastewater treatment facilities. The remainder of the population have septic fields. Since the population of the Minas Basin watershed has a greater rural population, a majority of

homes likely have their own septic field. For example, 32% of Kings county residents are on a municipal system with treatment, leaving a large proportion of population with private septic fields (KCED, 2001). It is unknown how many septic fields there are in the watershed and what condition they are in. Other residents may still even discharge waste directly into the Minas Basin or rivers flowing into them. See Table 48 for a summary of wastewater treatment and collection systems in the Minas Basin watershed. The levels of treatment for the wastewater treatment facilities in the Minas Basin watershed are summarized below in Table 47. Appendix H shows detailed records on Town and Municipal expenditures on sewage collection and disposal

There are not that many storm sewers in the Minas Basin with the exception of some of the towns including Truro, Windsor, Hantsport, Berwick and Wolfville. For the other areas, rivers by means of roadside ditches and culverts channel into storm water near.

Table 47
Level of Wastewater Treatment in the Minas Basin watershed

County	Level of Treatment
Colchester	3 secondary treatment facilities 1 tertiary treatment facility
Halifax	1 primary treatment facility 4 secondary treatment facilities 1 tertiary treatment facility
Hants	5 secondary treatment facilities 1 unknown treatment facility
Kings	1 primary treatment facility 7 secondary treatment facilities

Table 48
Wastewater Facilities in the Minas Basin watershed

County	Number of Wastewater Treatment Facilities	Number of Wastewater Collection Systems
Colchester	4	12
Cumberland	0	1
Hants	6	8
Halifax	6	5
Kings	8	11
Total	**24**	**36**

Solid Waste Facilities

The Provincial Waste Resource Management Regulations require at least 50% diversion of waste by 2000 throughout Nova Scotia. As a result, many of the landfills in the province have been closed. In the 1970's there was over 100 dumps and open –burning sites. Today there are only 18 landfills, with only 9 expected to be operating by 2005 (Resource Recovery Fund Board, date unknown). In Colchester County, over 20,000 tonnes of waste was received; 10,148 tonnes of this was recycled and 3,450 tonnes was composted in the year 2000 (Colchester County, date unknown). APPENDIX C shows

detailed records on Town and Municipal expenditures on Garbage collection and disposal. These are summarized in Figures 41-44.

Colchester County

Old Disposal Sites:
Bass River Disposal Site – Open Burning Dump, area: 65,000 sq.m (closure 1995)
Colchester Regional Landfill – information n/a
Truro Landfill – Landfill, area: 1,600,000 sq.m (closure in 1996)
Upper Stewiacke Disposal Site – Dump, area: 19,000 sq.m (closure in 1995)
Wittenburg Disposal Site – Dump, area: 22,000 sq.m (closure in 1995)
Current Operations:
Solid waste now goes to the *Balefill Facility* in Kemptown, *a* second-generation landfill. There is also an In Vessel composting program and organics go to a waste management park.

Cumberland County

Old Disposal Sites:
Advocate Ashfill Site – Ashfill, area 6,073 sq.m
Advocate Incinerator – (closure scheduled for 1996)
Swan Creek Road Landfill, Parrsboro – Landfill, area: 200,000 sq.m (closure for 1995)
Current Operations:
The area of Cumberland County in the Minas Basin watershed is not serviced by curbside collection, but there are two Transfer Stations in Advocate and Crossroads.
There are two operating Landfills: Cumberland Central Landfill and one in Oxford (both are outside the watershed)

Hants

Georgefield Landfill, Georgefield – Landfill, area: 150,000 sq.m (closure for 2000)
Cogmagun Road Landfill, Cogmagun River – Landfill, (closure scheduled for 2003)

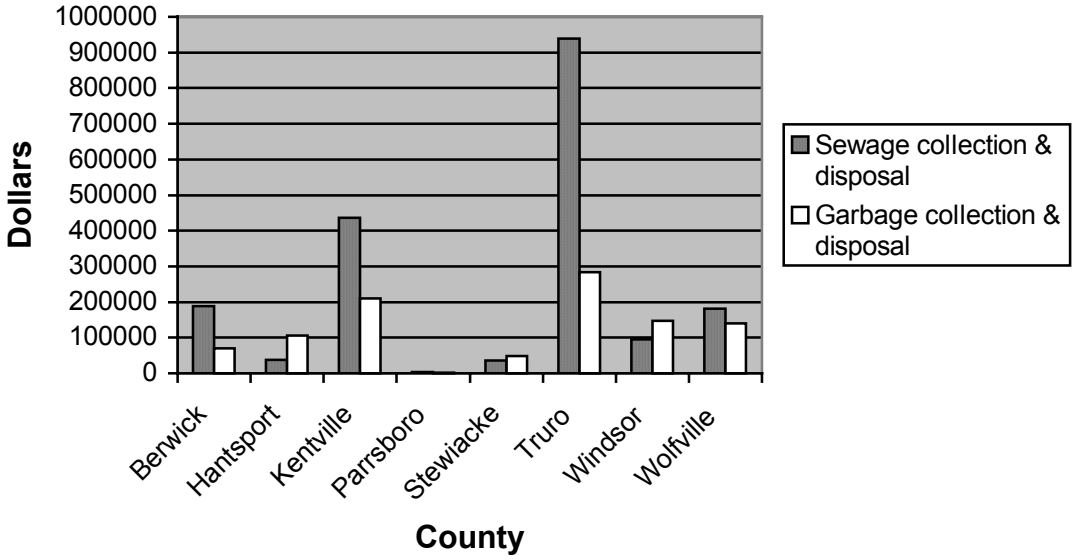
Kings County

Old disposal Sites:
Meadowview Landfill, Kentville – Landfill (closed 1999)
Current Operations:
There are currently no operating landfills in Kings County. Solid waste goes to the *Valley Waste Resource Management Authority* where it is sorted and from there:
- Recyclables go to Colchester Material Recovery Facilities
- Compostables go to New Era Farms in Halifax,
- Garbage goes to Chester Landfill for east, Queens County Landfill for west

Collection sites are located in Kentville and Lawrencetown

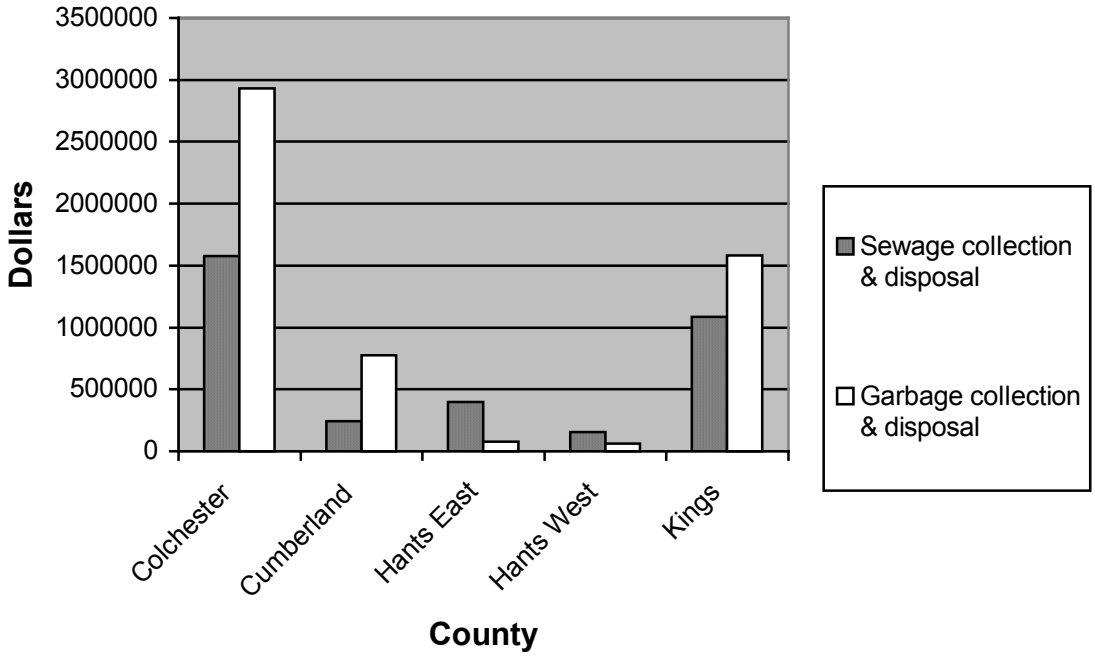
Sources: (Government of Nova Scotia, 2000; Colchester County, date unknown; Resource Recovery Fund Board, date unknown; Nova Scotia Department of Development, 1986)

Figure 41
Town Expenditures for Garbage and Sewage Collection and Disposal (1999)



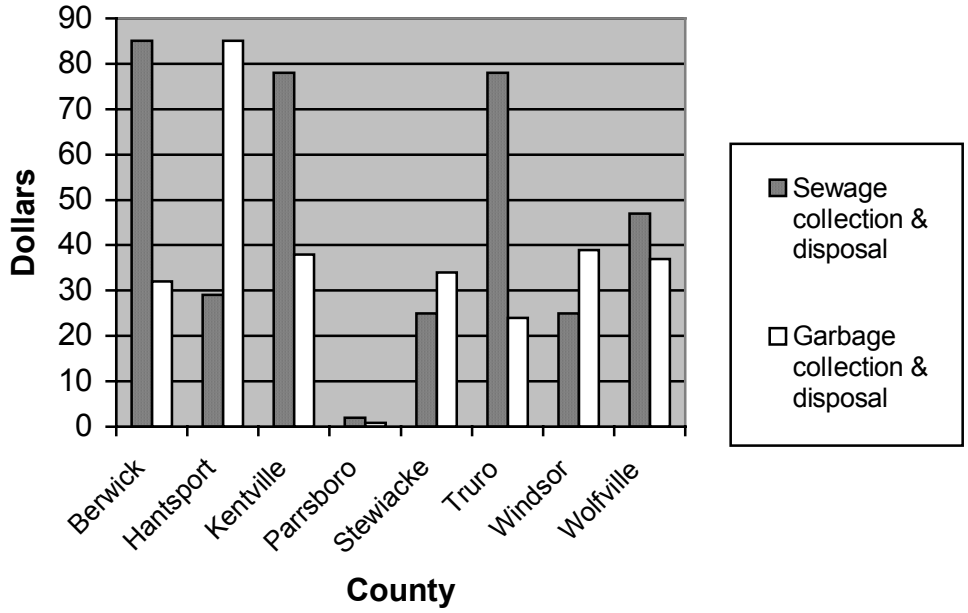
Source: (Service Nova Scotia and Municipal Relations, 2000)

Figure 42
Municipal Expenditures for Garbage and Sewage Collection and Disposal 1999



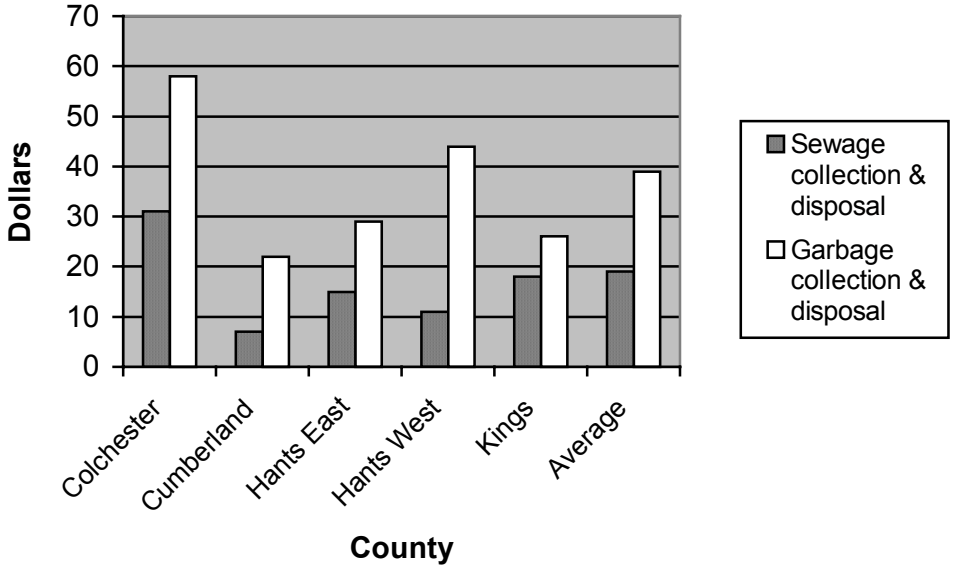
Source: (Service Nova Scotia and Municipal Relations, 2000)

Figure 43
Town Expenditures for Garbage and Sewage Collection & Disposal Per Person (1999)



Source: (Service Nova Scotia and Municipal Relations, 2000)

Figure 44
Municipal Expenditures for Garbage and Sewage Collection & Disposal Per Person (1999)



Source: (Service Nova Scotia and Municipal Relations, 2000)

8.4.4 Tidal and River Barriers

Close to half of the rivers flowing into the Bay of Fundy in Nova Scotia have barriers on them (Harvey et al, 1998). Reasons for putting barriers on rivers include agricultural protection, highway or road crossing, hydro or power generation, recreational or urban use, control of water levels or flows or the presence of functional fish way or aboiteaux (Wells, 1999). Tidal barriers, under-sized culverts, and bridge abutments impede tidal exchange and adversely affect rivers and their estuaries as well as areas far out into the Basin (Percy, 2001).

Dykes

The conversion of salt marsh to farmland by erecting dykes started in the 1600's and increased progressively until the 1800's (Wells, 1999). The salt marshes of the Upper Bay of Fundy have shrunk dramatically, and dyking and draining has resulted in the loss of 90% of the original salt marsh for agriculture (Wells, 1999; Government of Canada, 1991). There are extensive dyke-lands along a number of river systems including the Cornwallis, Salmon, and River Herbert to name a few. Wells (1999) suggests that 50% of barriers in Nova Scotia, which empty into the Bay of Fundy, are meant to protect or create agricultural land.

Some facts include:

- In 1961 over 6,500 acres of marshland area was protected by dykes in the Salmon River Watershed (East Coast Aquatics, 2001).
- It is estimated that 80% of the original salt marsh of Kings County has been dyked or filled in for agriculture (KCED, 2001)

Rivers with dams and/or causeways:
A detailed summary of barriers on rivers flowing into the Bay of Fundy can be found in Wells (1999). Below is a brief summary.
a) Avon River: solid rock causeway built in 1970
b) Parrsboro River : causeway and dam in harbour
c) *Great Village River: aboiteau
d) *Salmon River: bridges and abutments cross river in several locations
e) *Shubenacadie River: bridges and abutments
f) Tennycape River: causeway and culvert
g) Walton River: causeway and bridge
h) *Kennetcook River: bridge and abutments
i) *Gaspereau River: 5 power dams and some storage dams
j) St. Croix River: Panuke lake dam with power station
k) *Cornwallis River*
l) *Canard River: aboiteaux in place since 1700's/1800's
m) *Habitant River: aboiteaux in place since 1700's/1800's
n) *Pereaux River: aboiteaux in place since 1700's/1800's

** Indicates dyked lands next to rivers*

8.4.5 Urban Land Development

There are 8 major towns in the Minas Basin watershed and 4 villages. The largest population is Truro with approximately 11,000 residents but Kings County has the largest total urban population. Urban land-use is relatively low in each county, creating a primarily rural landscape. Not surprisingly, Halifax County has the largest percentage of urban land-use at 5%, followed by Kings County with 4% urban land. Cumberland and Colchester have the lowest percentage of urban land with 1% and 2% respectively.

Table 49
Urban land (in Counties located in the Minas Basin watershed ( )

County	Total area of County (sq. km)	Area of Urban land (sq. km)	% Urban land in County
Colchester	3,622	71.5	1.97%
Cumberland	4,288	44.7	1.04%
Hants	3,054	64.5	2.11%
Halifax	5,557	287.5	5.17%
Kings	2,182	87.8	4.02%
Total	**18,703**	**556**	**2.97%**

Source: (Nova Scotia Department of Natural Resources, 1998)

9.0 SUMMARY

Due to time and financial limitations it was difficult to compile a comprehensive profile for the Minas Bain watershed. There are many topics that could have been included or covered in more detail. Another difficulty in completing a watershed study is that political boundaries, by which most data is compiled, do not follow watershed boundaries. This profile therefore, does not always reflect an accurate image of the activities occurring in the watershed.

What the profile is able to illustrate, however, is that the Minas Basin watershed is a key area of Nova Scotia. Centrally located in the province, it comprises approximately 16.5% of the land area of Nova Scotia and carries close to the same percent of population: 17.8% of Nova Scotia's population, or 161,950 people. There are 7 counties, 8 incorporated towns, 4 villages and 4 first nations reserves in the watershed. The watershed is primarily a rural landscape dotted with denser populations in small to medium urban centres. The watershed not only is very rural in nature, it also has a high ratio of private land ownership. Although the overall population of the watershed has shown little change over the last decade, some areas, such as Kings County, have had the largest increase in population for Nova Scotia. An overall trend for the province is movement of populations into urban centres within close proximity to Halifax.
Although there tends to be a high recognition of the areas uniqueness and importance to wildlife, very little land and marine environments is protected. Much of the rural landscape is highly managed, consisting of a large amount of agriculture and forestry activity. The economy of the watershed has traditionally relied on primary resource activities such as agriculture, forestry, mining and fishing. Some of the most fertile soils of Nova Scotia exist in the Minas Basin watershed, particularly in Kings County and around Truro in Colchester County. These areas lead the province in livestock (chicken, pigs, cattle, bees), tree fruits, and vegetable production. Forestry is another prime resource industry in the watershed. Much of the watershed is covered in forests and it is a high percentage of privately owned in smallholdings. There are several large forestry companies harvesting in the watershed but there is also a large number of private woodlot owners. The harvest is primarily for softwood since the forests in the region are dominated by softwood species. Colchester County, which largely lies within the watershed, leads the province in total forest production. Another resource activity in the watershed is mining for industrial minerals such as aggregates, gypsum and peat. There is however, a major exploration in the mouth of the Shubenacadie River near Truro for titanium that may develop into a large production.

The Minas Basin itself is a dynamic environment due to its extreme tidal environment and high siltation. These factors have traditionally worked to provide a natural control of marine harvesting until recently. Higher-powered fishing vessels and a continual input of pollution from its surrounding landscape has greatly affected the fishery in the Minas Basin. Fewer local fishermen and vessels are operating in the Basin. This however, does not mean there is less fishing in the Basin, since larger vessels from the Bay of Fundy have been coming to fish in the Minas Basin. As the ground fishery has been declining,

there has been increased focus on the harvesting of molluscs and crustaceans such as clams, lobsters and more recently baitworms. The recreational fishery has also suffered from the polluted rivers in the Minas Basin watershed. In particular, the inner Bay of Fundy salmon have declined substantially in recent years and there are calls to list it as an endangered species.

Manufacturing in the Minas Basin watershed is becoming increasingly important to the economy of the region. It is one of the top employers along with Industry and the Retail Trade in the watershed. Many manufacturers support the resource industries (agriculture and forestry) such as food processing companies and saw mills. There are also a high proportion of textile manufacturers in the Windsor and Truro areas. The Sales and Service sector is the largest occupation in the watershed, which is the same as for Nova Scotia as a whole.

Along with increased manufacturing, tourism is becoming increasingly important in the watershed. The Minas Basin area and the Bay of Fundy are becoming sought after nature and ecotourism destinations. With its diverse marine and coastal environments, extreme tides, cultural history and outstanding wildlife, the promotion of the Minas Basin for nature and ecotourism has increased. With this emphasis will come an increased importance in protecting and preserving its natural features. There are many signs of increased care of the impacts of humans on the natural environment including the improvement and upgrading of wastewater facilities and the provincial initiative to close of landfills within the watershed.

This profile was able to paint a general picture of the resources, activities and land uses in the Minas Basin watershed. There are many more topics that could be investigated including location of contaminated and brownfield sites, number of private woodlot owners, location of forest company operations, amount of clear-cut forest, number of wells and septic systems etc. Perhaps the next step should be a more thorough investigation of the state of the resources and the effects the activities are having in the watershed.

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MAPS

APPENDICES

APPENDIX A

Some of the Major Employers in the Minas Basin watershed

Company	Classification	Location
Kings County		
ACA Co-operative Ltd*	Animal Production	New Minas
Acadia Students Union	Educational Services	Wolfville
Acadia University*	Educational Services	Wolfville
Annapolis Valley Housing Authority	Local - Regional Public Administration	New Minas
Annapolis Valley Peat Moss Co. Ltd.	Mining	Berwick
Annapolis Valley Regional School Board*	Educational Services	Berwick
Atlantic Food & Horticulture Research Centre	Federal Government Public Administration	Kentville
Atlantic Superstore	Food and Beverage Store	New Minas
Atlantic Theatre Festival	Amusement Industries	Wolfville
Avon Foods*	Food Manufacturing	Berwick
Bishops U-Pick and U-Catch Trout	Crop Production	Kentville
Burger King Restaurant	Food & Beverage Stores	Kentville
Canadian Tire Associate Store	General Merchandise Store	Kentville
Carey Brothers Masonry Ltd.*	Trade Contracting	Avonport
Charles Keddy Farms Ltd.	Crop Production	Kentville
Community Living Alternative Society	Nursing and Residential Care Services	Kentville
Dykeview Farms Ltd.	Crop Production	
Eassons Transport Ltd.	Transportation	
Eastern Bakeries Ltd.	Food Manufacturing	Berwick
Eastern Protein Foods*	Food Manufacturing	Kentville
Evergreen Home for Special Care	Nursing and Residential Services	Kentville
Flyer Services 1989 Ltd.	Administrative and Support Services	Kentville
G.K. Morse & Sons Transport Ltd.	Truck Transportation	Centreville
Gerald Kennie	Food Manufacturing	Kentville
Grand View Manor*	Nursing and Residential Care Services	Berwick
Great Valley Juices Inc.	Food Manufacturing	Kentville
H&R Block Limited	Professional, Scientific and Technical Services	Kentville
Harold Leggee Transport Ltd.	Truck Transportation	Port Williams
Hostess Frito-Lay Company*	Food Manufacturing	New Minas
Irving Big Stop	Gasoline Station	New Minas
Kentville Publishing	Printing Activities	New Minas
Kings Regional Rehabilitation Centre	Nursing and Residential Care Services	Kentville
Lafarge Canada Inc. Construction Materials Group	Mining	Kentville

Company	Classification	Location
Larsen Packers Ltd.*	Food Manufacturing	Berwick
Maritime Tel & Tel	Telecommunications	Kentville
McDonalds Restaurant	Food & Beverage Stores	New Minas
Michelin North America (Canada Inc.)*	Plastics and Rubber Products Manufacturing	Cambridge
Moody Bros. Groceries Ltd.	Food and Beverage Stores	Berwick
Municipality of the County of Kings	Local, Regional Public Administration	Kentville
Nova Scotia Community College – Kingstec	Educational Services	Kentville
Nova Scotia Youth Centre	Provincial Public Administration	Waterville
Old Orchard Inn Ltd*	Accommodation Services	Wolfville
On-Line Support	Administrative and Support Services	Kentville
Perry Rand Ltd.	Transportation	Waterville
Randsland Farms Inc	Crop Production	Canning
Roscoe Construction Ltd.	Trade Contracting	Waterville
Sarsfield Foods Ltd.*	Food Manufacturing	Kentville
Sawler Gardens Ltd.	Crop Production	Berwick
Scotian Gold Co-operative Ltd.	Food Manufacturing/Production	Kentville
Sobeys Stores Ltd.	Food and Beverage Stores	New Minas
Sodexho Marriott	Food Services	Wolfville ?
Springvale Nurseries Ltd.		Berwick
Stirling Fruit Farms*	Crop Production	Wolfville
Sweetripe Drinks Ltd. – Allen's Plant	Food Manufacturing	Port Williams
The Maple Leaf Poultry Co./Shur Gain*	Animal Production	Kentville
Town of Kentville	Local – Regional Public Administration	Kentville
Town of Wolfville	Local - Regional Public Administration	Wolfville
Valley Regional Hospital*	Hospital	Kentville
Victorian Order of Nurses	Ambulatory Care Services	Kentville
Wandlyn Inn	Accommodation Services	Coldbrook
Weavexx*	Machinery Manufacturing	Kentville
Wolfville Nursing Homes Ltd.	Nursing and Residential Care Services	Wolfville
Zellers Department Store	General Merchandise Stores	New Minas
Webster Farms Ltd.*	Food Production	Cambridge
Hants County		
Avon Valley Greenhouses*	Greenhouse Products	Falmouth
Casey Concrete Limited	Building Material and Garden Equipment and Supplies Dealers	Milford
CKF Inc.*	Converted Paper Products	Hantsport
Courthouse Hill Farm	Food Production	Kennetcook
Dillman Enterprises Ltd.*	Hwy, Street and Bridge Construction	Shubenacadie

Company	Classification	Location
Dykeland Lodge*	Home for Personal & Nursing Care	Windsor
Elmsdale Lumber	Wood Products Manufacturing	Elmsdale
Fundy Gypsum Company Ltd.*	Mining	Windsor
Hants Community Hospital	Hospital	Windsor
Hants West District School Board	Educational Services	Berwick
Heritage Memorials	Miscellaneous Manufacturing	Windsor
Home Support Central	Ambulatory Care Services	Windsor
Kings Edgehill School	Educational Services	Windsor
Ledwidge Lumber Company Limited	Wood Product Manufacturing	Enfield
Mi kmaq Family and Children Services of Canada	Local – Regional Public Administration	Shubenacadie
Minas Basin Pulp and Power Co. Ltd.*	Paperboard Manufacturer	Hantsport
Municipality of East Hants	Local – Regional Public Administration	Shubenacadie
National Gypsum Canada Ltd.*	Mining	Milford
Nova Scotia Textiles Limited*	Textile Manufacturers	Windsor
Polestar Transport Incorporated	Truck Transportation	Hantsport
Rainbow Farms Ltd.		Upper Rawdon
Russell White Lumber Ltd.	Wood Product Manufacturing	Nine Mile River
Scotia Investments Ltd.*	Professional, Scientific and Technical Services	Hantsport
Shaw Resources	Mining	Shubenacadie
Ski Martock*	Amusement Industries	Windsor
Springwater Acres		Kennetcook
Sobeys Inc.	Food & Beverage Stores	Windsor
The Shaw Group Limited*	Clay and Concrete Products	Lantz
Windsor Elms*	Nursing and Residential Care Services	Windsor
Colchester County		
Atlantic Superstore	Food & Beverage Stores	Truro
Brookfield Lumber Co. Ltd.	Wood Production Manufacturing	Brookfield
Burger King	Food & Beverage Stores	Truro
Canada Post Corporation	Federal Government Public Administration	Truro
Canadian Automotive Radiator Exchange & Ltd.*	Machinery Manufacturing	Debert
Canadian Tire Associate Store*	General Merchandise Store	Truro
Chignecto-Central Regional School Board*	Educational Services	Truro
Children's Aid Society & Family Services*	Children's Aid Services	Truro
Clarence Farm Services		Stewiacke
Colchester Residential Services Society	Nursing & Residential Care Services	Truro
Colchester Community Workshops		Truro
Colchester Regional Hospital*	Hospital	Truro

Company	Classification	Location
Cormier Five Island Clams	Food Manufacturing	Five Islands
Crossley Carpet Mills Limited*	Manufacturing	Truro
Department of Natural Resources	Provincial Government Public Administration	Truro
Department of Transportation	Provincial Government Public Administration	Truro
Farmers Co-operative Dairy Ltd.	Food Manufacturing	Salmon River
Fundy Textiles and Design Ltd.	Textiles Manufacturing	Truro
Glengarry Motel and Restaurant*	Accommodation Services	Truro
Harveys Restaurant	Food & Beverage Stores	Truro
Hillcrest Manor*	Nursing and Residential Care Services	Truro
Homehardware Distribution Centre*	Building Material Supply – Wholesaler - Distributor	Debert
Inland Technologies		Debert
Intertape Polymer Inc.*	Manufacturing	Truro
Julimar Lumber Co. Ltd.	Wood Product Manufacturing	Brookfield
Keddys Motor Inn	Accommodation Services	Truro
Kerr Controls Limited+		Truro
Kohler International Ltd.*	Miscellaneous manufacturing	Debert
LaFarge Canada Ltd.	Mining	Brookfield
L&R Drilling and Blasting Ltd.	Professional, Scientific and Technical Services	Truro
MacQuarrie's Drugs*	Pharmacies and Drug Stores	Truro
Marwood Ltd.		Brookfield
Millbrook Band Councils	Local - Regional Public Administration	Truro
Municipality of the County of Colchester	Local – Regional Public Administration	Truro
Newmac Manufacturing	Manufacturing	Debert
Nova Enterprises	Manufacturing	Brookside
Nova Institution		Truro
Nova Scotia Agricultural College*	Educational Services	Truro
Nova Scotia Community College – Truro Campus	Educational Services	Truro
Nova Scotia Residential Centre	Nursing & Residential Care Services	Truro
Orenda Recip Inc.*	Aerospace Product and Parts Manufacturing	Debert
Scotsburn Dairy Group*	Food Manufacturing	Truro
Shubenacadie Band Council	Local – Regional Public Administration	Indian Brook
Shur Gain	Food Manufacturing	Truro
Sobey's Distribution Centre	Food & Beverage Stores	Debert
Sproule Lumber Mill (owned by Irving)	Wood Product Manufacturing	Valley
Stanfields*	Textile Manufacturing	Truro
The Daily News	Printing Activities	Truro

Company	Classification	Location
The Mira		Truro
The Town of Truro*	Local – Regional Public Administration	Truro
Tim Hortons (combined Franchised Stores)	Food & Beverage Stores	
Truro Raceway (N.S.P.E.)	Amusement Industry	Truro
Victorian Order of Nurses	Ambulatory Health Care Services	Truro
Wendys Restaurant	Food & Beverage Stores	Truro
Zellers	General Merchandise Store	Truro
Cumberland County		
Advocate Seafood Ltd.	Food Manufacturing	Advocate Harbour
Atlantic Sunline Ltd.		Parrsboro
C.E. Harrison & Sons Ltd.		Halfway River
DL Hanna and Sons Ltd		Parrsboro
Harrison Building Centres	Building Material Supply – Wholesaler – Distributor	Parrsboro
Oxford Frozen Foods*	Food Manufacturing	Parrsboro (seasonal)
Parrsboro Metal Fabricators Ltd.*	Heating Equip. & Commercial Refrigeration Manufacturing	Parrsboro
Halifax County		
Air Nova*	Airline	Enfield (Airport)
Cara Operations Ltd.*	Food Service Contracts	Enfield (Airport)
Litton Systems Canada Ltd.*	Navigational & Guidance Instruments Manufacturing	Enfield (Airport)
Pratt & Whitney Canada*	Aerospace Product & Parts Manufacturing	Enfield (Airport)
IMP Group Limited		Enfield (Airport)
Lewidge Lumber	Wood Product Manufacturing	Enfield
Scotian Homes	Wood Product Manufacturing	Enfield

* In Nova Scotia's Largest Employers with One Hundred of More Employees - 1998

Sources:

Nova Scotia's Largest Employers with One Hundred or More Employees – 1998
Nova Scotia's Manufacturers 1998-1999
Colchester County Economic Baseline Study - By Bruce MacNutt
Hants County NS Socio-Economic Profile – by Hants RDA, November 2000
The State of the Regions, The Economic Region of Northeastern Nova Scotia – by The Canadian Institute for Research on Regional Development, 1997
Human Resources Development Canada – Nova Scotia Directory of Employers

APPENDIX B

Nova Scotia Nature Trust Properties and Stewardship Agreements in the Minas Basin watershed

Properties Owned by Nova Scotia Nature Trust in Minas Basin watershed

Name of Property	Size of Property	Location of Property	Significance
Brothers Island	10 acres	Two Islands, Cumberland County	Bay of Fundy Islands
Gaspereau	200 acres	Gaspereau, Kings County	Representative Woodlands
*Wolfville Ridge	20 acres	Wolfville, Kings County	Representative woodlands
Rhines Creek	3 acres	Fort Ellis, Hants County	Saltmarsh

** in progress*

Nova Scotia Nature Trust Stewardship Agreements in Minas Basin watershed

Size of Property	Location of Property	Significance
Hants County		
2.3 acres	Noel	Coastal salt marsh
Unknown	Noel	Coastal salt marsh
7 acres	Noel	Coastal salt marsh
10 acres	Noel	Coastal salt marsh
2-3 acres	Noel	Coastal salt marsh
3 acres	Noel	Coastal salt marsh
unknown	Noel	Coastal salt marsh
10 acres	Noel	Coastal salt marsh
unknown	Noel	Coastal salt marsh
5-7 acres	Noel	Coastal salt marsh
20 acres	Noel	Coastal salt marsh
80 acres	Mt. Uniacke	Mixed climax forest
80 acres	Mt. Uniacke	Mixed climax forest
75 acres	Mt. Uniacke	Mixed old growth – hemlock
240 acres	Mt. Uniacke	Climax – old growth forest
8 acres	Newport	Mixed old growth forest
10 acres	Newport	Mixed old growth forest
18 acres	Newport	Mixed old growth forest
10 acres	Newport	Mixed old growth forest
50+ acres	Clarksville	Riparian old growth forest
30 acres	Nine Mile River	Old growth softwood forest
78 acres	South Maitland	Wetlands
57 acres	Newport	Floodplain
91 acres	Newport	Gypsum soil – unique features
65 acres	Newport	Gypsum soil – unique features
200 acres	Ellerhouse	Gypsum soil – unique features

Size of Property	Location of Property	Significance
20 acres	Newport	Old – unique forest, rare plants
10 acres	Brooklyn	Rare plants, gypsum outcrop
Kings County		
Unknown	Blomidon	Artic – Alpine flora
111 acres	Blomidon	Artic – Alpine flora
Unknown	Kentville Ravine	Old growth forest
Colchester County		
5-7 acres	Scotch Village	Coastal salt marsh
36 acres	Great Village	Coastal salt marsh
13 acres	Kemptown	Floodplain

Source: (Nova Scotia Nature Trust, 2001)

APPENDIX C

Environmental Health Expenditures for Towns and Municipalities in Minas Basin watershed (1999)

	Environmental Health Services				
Towns	**Population (1996 data)**	**Sewage collection &disposal**	**Garbage & waste collection &disposal**	**Other Env. health**	**Total**
Berwick	2,195	188,541	70,880		259,421
Hantsport	1,252	37,525	106,493	4,380	148,398
Kentville	5,551	435,823	209,670		645,493
Parrsboro	1,617	3,365	1,479		4,844
Stewiacke	1,405	35,977	47,900		83,877
Truro	11,938	938,312	283,673		1,221,985
Windsor	3,726	95,391	147,570		242,961
Wolfville	3,833	180,793	140,918		321,711
Total	**31,517**	**1,915,727**	**1,008,583**	**4,380**	**2,928,690**
Municipalities					
Colchester	50,432	1,578,001	2,932,473		4,510,474
Cumberland	34,552	242,865	773,985		1,016,850
Hants East	26,648	396,683	764,319		1,161,002
Hants West	13,792	153,390	612,226		765,616
Kings	60,661	1,085,900	1,580,100		2,666,000
Total	**186,085**	**3,456,839**	**6,663,103**		**10,119,942**

Sources: (Service Nova Scotia and Municipal Relations, 2000; Statistics Canada, 1997)

APPENDIX D

Development Expenditures for Towns and Municipalities in Minas Basin watershed (1999)

	Environmental Development Services							
Towns	**Env. Planning & zoning**	**Community Develop.**	**Housing**	**Natural Resource Develop.**	**Regional Dev. Comm.**	**Industrial Parks & Comm.**	**Other Env. Develop. Services**	**Total**
Berwick							4,702	4,702
Hantsport							3,218	3,218
Kentville	137,873	1,451		43,095			30,082	212,501
Parrsboro	59,109	14,927	21,010		12,174	2,793	4,337	114,350
Stewiacke	598						2,767	3,365
Truro	209,772	216,319					15,819	441,910
Windsor	63,911						2,075	65,986
Wolfville	75,407	180,545					39,169	295,121
Total								
Municipalities								
Colchester	31,562						56,834	88,396
Cumberland	90,780					31,960	6,350	129,090
Hants East	222,148				51,889		15,619	290,656
Hants West	78,753			1,000	35,787		731	116,271
Kings	401,200	185,600					65,000	651,800
Total								

Sources: (Service Nova Scotia and Municipal Relations, 2000; Statistics Canada, 1997)

APPENDIX E

Primary Fishery Organizations in Minas Basin (Excluding Provincial Organizations)

Advocate Fishermen's Association – Mike Fraser, Advocate
Bay of Fundy Fisheries Council – Arthur Bull, Digby
Bay of Fundy Inshore Fisherman's Association – Juniour Theriault
Cobequid Salmon Association – Dick Huggard, Truro
Fundy Fixed Gear Council – Arthur Bull, Digby
Lobster Fishing LFA#35 – Greg Hamilton, Harbourville
Millbrook Fisheries – Andrew Johnson, Truro
Minas Basin Clam Fishers Association – Mike Lewis, Five Islands
Parrsboro and Area Recreational Fishing Association – Rand Corcoran, Parrsboro
Scotia Fundy Mobile Gear Fishermen's Association – Brian Giroux
Square Net and Gaspereau Fishermen – Alan Gertridge, Wolfville
Upper Bay of Fundy Draggers Association – Glanville Travis, Canning
Source: (Willcocks-Musselman, April 2000)

APPENDIX F

Weight of Fish Landed in Minas Basin Landing Ports, 1991, 1996 and 1999

Species	Cape Split Area (Zone 41)			Colchester County (Zone 43)		
	1991	1996	1999	1991	1996	1999
Groundfish						
Cod	131	1,761	442	857	0	0
Haddock	0	2	113	0	0	0
Atlantic Halibut	108	0	0	839	0	0
American Plaice	10,139	0	0	0	0	0
Yellowtail Flounder	0	0	0	0	0	0
Greysole-witch	1,105	0	0	0	0	0
Winter Flounder	0	9,668	9,117	0	0	0
Unspecified Flounder	55,227	50,782	42,909	5,720	0	0
Skate	0	0	0	0	0	0
Dogfish	0	0	4,592	0	0	0
Pollock	0	4	0	0	0	0
White Hake	0	1	0	0	0	0
Catfish	0	0	5	0	0	0
Monkfish	89	180	0	0	0	0
Sculpin	0	0	0	0	0	0
Unspecified Groundfish	0	0	0	0	0	0
Pelagic & Estuarine						
Herring	4,536	0	0	4,243	0	0
Unspecified Pelagic	0	0	0	57	0	0
Alewife	197,947	77,872	61,062	8,345	9,545	11,766
Eels	0	8	10	40	39	242
American Shad	0	0	0	9,578	40,512	11,282
Smelts	0	0	0	217	0	0
Striped Bass	0	0	0	1,540	0	0
Sturgeon	483	0	0	528	0	0
Hammerhead Shark	82	0	0	0	0	0
Molluscs & Crustaceans						
Soft shell clams	0	0	0	952,333	276,733	152,712
Sea Scallops	0	0	0	0	0	839
Lobster	9,802	67,690	21,886	27,692	23,689	22,255
Jonah Crab	0	0	0	0	0	0
Rock Crab	0	0	0	0	0	0
Sea Plants						
Dulse (suppressed)						
Total	**279,649**	**207,968**	**140,136**	**1,012,259**	**350,518**	**199,096**

Species	Cumberland County (Zone 44)			Hants County (Zone 42)		
	1991	1996	1999	1991	1996	1999
Groundfish						
Cod	90	0	0	0	0	0
Haddock	0	0	0	0	0	0
Atlantic Halibut	753	35	0	0	0	0
American Plaice	0	0	0	0	0	0
Yellowtail Flounder	62	798	0	0	0	0
Greysole-witch	830	256	0	0	0	0
Winter Flounder	120	0	0	0	0	0
Unspecified Flounder	3,821	632	0	2,319	0	0
Skate	0	18	0	0	0	0
Dogfish	0	4,536	45,532	0	0	0
Pollock	0	0	0	0	0	0
White Hake	0	0	0	0	0	0
Catfish	0	0	0	0	0	0
Monkfish	0	0	0	0	0	0
Sculpin	0	0	0	0	0	0
Unspecified Groundfish	0	0	0	0	0	0
Pelagic & Estuarine						
Herring	2,538	0	0	1,850	0	0
Unspecified Pelagic	0	0	0	0	0	0
Alewife	0	0	0	91,977	48,126	140,928
Eels	3,405	2,054	1,789	0	906	598
American Shad	0	29,739	305	6,980	18,899	8,779
Smelts	0	0	0	0	0	114
Striped Bass	0	0	0	254	0	0
Sturgeon	0	0	0	0	0	0
Hammerhead Shark	0	0	0	0	0	0
Molluscs & Crustaceans						
Soft shell clams	2,395	15,736	0	9,788	859	0
Sea Scallops	580,167	5,644	121,085	0	0	0
Lobster	28,614	143,922	181,624	0	1,770	0
Jonah Crab	0	0	0	0	0	0
Rock Crab	0	0	0	0	0	0
Sea Plants						
Dulse (suppressed)						
Total	**622,765**	**203,370**	**350,335**	**113,168**	**70,560**	**150,419**

Species	Kings County (Zone 40)		
	1991	1996	1999
Groundfish			
Cod	2,294	4,191	2,014
Haddock	0	1,044	1,701
Atlantic Halibut	439	556	504
American Plaice	6,303	0	0
Yellowtail Flounder	339	0	0
Greysole-witch	0	0	0
Winter Flounder	0	0	2,461
Unspecified Flounder	59,268	24,425	19,868
Skate	0	0	33
Dogfish	0	0	1,867
Pollock	0	212	123
White Hake	0	0	0
Catfish	0	18	0
Monkfish	0	277	0
Sculpin	0	0	200
Unspecified Groundfish	0	0	90
Pelagic & Estuarine			
Herring	25,272	0	0
Unspecified Pelagic	0	0	0
Alewife	0	0	0
Eels	0	0	0
American Shad	1,650	57	0
Smelts	0	0	0
Striped Bass	0	0	0
Sturgeon	5,345	0	0
Hammerhead Shark	0	0	0
Molluscs & Crustaceans			
Soft shell clams	0	0	0
Sea Scallops	103,231	13,249	33,015
Lobster	29,112	57,594	104,107
Jonah Crab	0	0	2,087
Rock Crab	0	122	5,702
Sea Plants			
Dulse (suppressed)			
Total	**233,253**	**101,747**	**173,772**

Source: Department of Fisheries and Oceans, special ad hoc tabulations

APPENDIX G

Value of Fish Landed in Minas Basin Landing Ports, 1991, 1996 and 1999

Species	Cape Split Area (Zone 41)			Colchester County (Zone 43)		
	1991	1996	1999	1991	1996	1999
Groundfish						
Cod	172	2,685	928	2,550	0	0
Haddock	0	5	250	0	0	0
Atlantic Halibut	400	0	0	7,178	0	0
American Plaice	13,410	0	0	0	0	0
Yellowtail Flounder	0	0	0	0	0	0
Greysole-witch	1,462	0	0	0	0	0
Winter Flounder	0	15,916	16,080	0	0	0
Unspecified Flounder	71,962	83,618	75,674	12,210	0	0
Skate	0	0	0	0	0	0
Dogfish	0	0	1,519	0	0	0
Pollock	0	4	0	0	0	0
White Hake	0	2	0	0	0	0
Catfish	0	0	4	0	0	0
Monkfish	54	94	0	0	0	0
Sculpin	0	0	0	0	0	0
Unspecified Groundfish	0	0	0	0	0	0
Pelagic & Estuarine						
Herring	1,500	0	0	1,801	0	0
Unspecified Pelagic	0	0	0	63	0	0
Alewife	65,463	25,699	16,488	5,445	3,151	3,178
Eels	0	4,169	552	115	189	538
American Shad	0	0	0	6,034	29,476	3,724
Smelts	0	0	0	240	0	0
Striped Bass	0	0	0	4,818	0	0
Sturgeon	721	0	0	2,330	0	0
Hammerhead Shark	150	0	0	0	0	0
Molluscs & Crustaceans						
Soft shell clams	0	0	0	990,426	400,900	359,570
Sea Scallops	0	0	0	0	0	2,060
Lobster	88,290	845,261	301,512	237,477	294,647	313,839
Jonah Crab	0	0	0	0	0	0
Rock Crab	0	0		0	0	0
Sea Plants						
Dulse (suppressed)						
Total	**243,582**	**977,453**	**413,006**	**1,270,685**	**728,363**	**682,908**

Species	Cumberland County (Zone 44)			Hants County (Zone 42)		
	1991	1996	1999	1991	1996	1999
Groundfish						
Cod	234	0	0	0	0	0
Haddock	0	0	0	0	0	0
Atlantic Halibut	6,338	347	0	0	0	0
American Plaice	0	0	0	0	0	0
Yellowtail Flounder	48	994	0	0	0	0
Greysole-witch	1,277	494	0	0	0	0
Winter Flounder	231	0	0	0	0	0
Unspecified Flounder	7,585	1,100	0	4,680	0	0
Skate	0	12	0	0	0	0
Dogfish	0	2,300	23,886	0	0	0
Pollock	0	0	0	0	0	0
White Hake	0	0	0	0	0	0
Catfish	0	0	0	0	0	0
Monkfish	0	0	0	0	0	0
Sculpin	0	0	0	0	0	0
Unspecified Groundfish	0	0	0	0	0	0
Pelagic & Estuarine						
Herring	1,039	0	0	816	0	0
Unspecified Pelagic	0	0	0	0	0	0
Alewife	0	0	0	60,832	15,885	38,054
Eels	9,778	9,051	5,492	0	76,045	1,318
American Shad	0	21,637	101	4,397	13,758	2,899
Smelts	0	0	0	0	0	510
Striped Bass	0	0	0	840	0	0
Sturgeon	0	0	00	0	0	0
Hammerhead Shark	0	0	0	0	0	0
Molluscs & Crustaceans						
Soft shell clams	3,427	23,197	0	14,439	1,402	0
Sea Scallops	674,852	12,198	294,118	0	0	0
Lobster	250,239	1,766,755	2,540,223	0	20,419	0
Jonah Crab	0	0	0	0	0	0
Rock Crab	0	0	0	0	0	0
Sea Plants						
Dulse (suppressed)						
Total	**955,047**	**1,838,104**	**2,863,820**	**86,004**	**127,510**	**42,781**

Species	Kings County (Zone 40)		
	1991	1996	1999
Groundfish			
Cod	3,131	8,071	4,825
Haddock	0	1,919	4,547
Atlantic Halibut	2,179	4,096	3,962
American Plaice	8,416	0	0
Yellowtail Flounder	373	0	0
Greysole-witch	0	0	0
Winter Flounder	0	0	4,340
Unspecified Flounder	75,743	45,643	39,430
Skate	0	0	15
Dogfish	0	0	823
Pollock	0	212	176
White Hake	0	0	0
Catfish	0	13	0
Monkfish	0	173	0
Sculpin	0	0	88
Unspecified Groundfish	0	0	40
Pelagic & Estuarine			
Herring	11,011	0	0
Unspecified Pelagic	0	0	0
Alewife	0	0	0
Eels	0	0	0
American Shad	825	42	0
Smelts	0	0	0
Striped Bass	0	0	0
Sturgeon	8,111	0	0
Hammerhead Shark	0	0	0
Molluscs & Crustaceans			
Soft shell clams	0	0	0
Sea Scallops	117,824	27,492	77,860
Lobster	246,700	726,097	1,457,239
Jonah Crab	0	0	2,393
Rock Crab	0	81	4,597
Sea Plants			
Dulse (suppressed)			
Total	**474,314**	**813,839**	**1,600,334**

Source: Department of Fisheries and Oceans, special ad hoc tabulations

APPENDIX H

Total Quantity &Value of Fish Landed in Minas Basin and Minas Channel (Zones 40-44) - 1991, 1996, 1999

Species	Total Quantity (kilograms)			Total Value (dollars)		
	1991	1996	1999	1991	1996	1999
Groundfish						
Cod	3,372	5,952	2,456	6,087	10,756	5,753
Haddock	0	1,046	1,814	0	1,923	4,797
Atlantic Halibut	2,139	593	504	16,094	4,443	3,962
American Plaice	16,442	0	0	21,826	0	0
Yellowtail Flounder	401	798	0	421	994	0
Greysole-witch	1,935	256	0	2,739	494	0
Winter Flounder	120	9,668	11,578	231	15,916	20,420
Unspecified Flounder	126,355	75,839	62,777	172,180	130,361	115,104
Skate	0	18	33	0	12	15
Dogfish	0	4,536	51,991	0	2,300	26,220
Pollock	0	216	123	0	216	176
White Hake	0	1	0	0	2	0
Catfish	0	18	5	0	13	4
Monkfish	89	457	0	54	267	0
Sculpin	0	0	200	0	0	88
Unspecified Groundfish	0	0	90	0	0	40
Pelagic & Estuarine						
Herring	38,439	0	0	16,167	0	0
Unspecified Pelagic	57	0	0	63	0	0
Alewife	298,269	135,543	213,756	131,739	44,735	57,720
Eels	3,445	3,007	2,639	9,893	89,454	7,899
American Shad	18,208	89,207	20,366	11,256	64,914	6,723
Smelts	217	0	114	240	0	510
Striped Bass	1,794	0	0	5,658	0	0
Sturgeon	6,356	0	0	11,162	0	0
Hammerhead Shark	82	0	0	150	0	0
Molluscs & Crustaceans						
Soft shell clams						
Sea Scallops	964,516	293,328	152,712	1,008,291	425,499	359,570
Lobster	683,398	18,893	154,939	792,676	39,690	374,038
Jonah Crab	95,490	294,665	329,872	822,705	3,653,199	4,612,812
Rock Crab	0	0	2,087	0	0	2,393
	0	122	5,702	0	51	4,597
Sea Plants						
Dulse (suppressed)						
Total	**2,261,124**	**934,163**	**1,013,758**	**3,029,632**	**4,485,269**	**5,602,848**

Source: Department of Fisheries and Oceans, special ad hoc tabulations

APPENDIX I

Contact Information for Aquaculture Facilities in Minas Basin watershed (2001)

Licence Number	Proponent	Contact	Address
0213	Larry MacPhee et. al	Larry MacPhee	RR#1 Kennetcook NS, B0N 1P0
0517	Elizabeth Semple	Elizabeth Semple	RR#2 Malagash, NS, B0K 1E0
0583	Mike Cameron	Mike Cameron	RR#6 Truro, NS, B2N 5B4
0862	Darrell J. Westerman	Darrell J. Westerman	P.O. Box 96, Stewiacke, NS, B0N 2J0
0964	Beavers Tide View Mini Golf	Ken Beaver	4661 Upper Economy, Colchester County, NS, B0M 1J0
0973	Alderbranch U-Fish	Craig Creelman	RR#1 Bass River, NS, B0M 1B0
1036	Mike Cameron	Mike Cameron	RR#6 Truro, NS, B2N 5B4
1050	Tidal River Farms Limited	Bruce Blacklock	RR#1, 284 Debert Beach Road, Debert, NS, B0M 1G0
1076	Broadview Farms	Peter Elderkin	RR#2 Wolfville, NS, B0P 1X0
1077	Keith Tupper	Keith Tupper	RR#3 Canning, NS, B0P 1H0
1094	Brian Sullivan	Brian Sullivan	RR#6 Truro, NS, B2N 5B4
1156	Darren Cameron	Darren Cameron	324 Gorman Road, RR#6 Truro, NS, B2N 5B4
1209	Atlantic Ova Pro Ltd.	Paul Merlin	RR#2 Wentworth Valley, NS, B0M 1Z0
8279ALT	Two Rivers Bass Hatchery	Ralph Meadows	General Delivery, Stewiacke, NS, B0N 2J0
8364	Simme/Paula Attenburg	Simme/Paula Attenburg	RR#2 Stewiacke, NS, B0N 2J0

Source: (Nova Scotia Department of Fisheries and Agriculture, 2001)

APPENDIX J

Forest and Non Forested Land Categories by Ownership for Counties in the Minas Basin watershed (2000)

	Ownership				Total
	Crown	Large Private	Small Private	Federal	
Colchester					
Softwood	24,987	57,000	74,549	373	154,910
Mixed wood	4,726	11,212	17,984	123	34,044
Hardwood	15,225	28,170	27,639	101	71,135
Other	3,866	11,108	18,902	112	33,888
Total Forested	**48,804**	**107,490**	**138,974**	**710**	**293,977**
Non Forest	**2,173**	**4,744**	**51,186**	**397**	**58,500**
Cumberland					
Softwood	32,918	49,312	71,658	413	154,302
Mixed wood	6,684	15,258	23,137	106	45,185
Hardwood	20,387	33,483	48,425	251	102,546
Other	4,296	19,867	15,875	11	40,049
Total Forested	**64,285**	**117,920**	**159,095**	**781**	**342,082**
Non Forested	**8,315**	**8,018**	**61,686**	**1,129**	**79,148**
Hants					
Softwood	21,660	54,139	55,812	591	132,203
Mixed wood	4,780	14,611	22,828	171	42,390
Hardwood	6,193	20,664	30,817	228	57,902
Other	866	7,479	7,008	51	15,404
Total Forested	**33,499**	**96,893**	**116,465**	**1041**	**247,899**
Non Forested	**3,885**	**5,652**	**42,936**	**318**	**52,790**
Halifax					
Softwood	114,762	80,648	115,648	845	311,902
Mixed wood	11,935	9,993	20,014	270	42,212
Hardwood	18,708	13,047	24,752	819	57,325
Other	6,824	9,116	7,912	55	23,907
Total Forested	**152,228**	**112,804**	**168,327**	**1,989**	**435,347**
Non Forested	**33,470**	**8,281**	**59,431**	**1,630**	**102,812**
Kings					
Softwood	8,269	13,466	29,397	344	51,475
Mixed wood	3,749	4,497	14,001	134	22,381
Hardwood	16,550	11,112	38,330	560	66,552
Other	292	1,481	4,392	120	6,285
Total Forested	**28,860**	**30,555**	**86,121**	**1,158**	**146,694**
Non Forested	**2,582**	**3,325**	**56,416**	**847**	**63,170**

Source: (Nova Scotia Department of Natural Resources, 2001c)

APPENDIX K

Forest Harvest for Counties in the Minas Basin watershed (1999 & 2000)

	Soft/ Hard Wood	Provincial M3 solid		Export m3 solid		Total m3 solid	
		1999	2000	1999	2000	1999	2000
Private Owners							
Colchester	Softwood	254,101	254,960	150,595	213,983	404,696	468,943
	Hardwood	14,470	12,083	33,651	31,312	48,121	43,395
Cumberland	S	146,043	112,924	252,484	204,145	398,527	317,069
	H	2,570	1,106	41,364	70,158	43,934	71,264
Hants	S	194,061	189,057	19,193	30,980	213,254	220,037
	H	13,581	9,988	9,598	17,432	23,179	27,420
Halifax	S	256,707	247,957	21,149	21,688	277,856	269,645
	H	26,003	9,908	8,394	8,219	34,397	18,127
Kings	S	167,612	110,920	2,640	23,041	170,252	133,961
	H	11,133	5,594	1,618	3,745	12,751	9,339
Industrial Owners							
Colchester	S	283,466	300,170	19,848	31,312	303,314	331,482
	H	29,583	28,128	38,473	59,366	24,692	87,494
Cumberland	S	68,737	130,181	67,869	77,328	136,606	207,509
	H	7,793	13,211	16,899	13,223	24,692	26,434
Hants	S	113,326	219,605	11,135	27,812	124,461	247,417
	H	40,509	37,525	10,843	23,523	51,352	61,048
Halifax	S	239,185	228,630	1,929	16,418	241,114	245,048
	H	13,842	10,205	15,297	19,286	29,139	29,491
Kings	S	64,896	71,643	0	4,562	64,896	76,205
	H	5,982	7,925	7,067	15,640	13,049	23,565
Crown Lands							
Colchester	S	57,383	12,803	5,521	9,599	62,904	22,402
	H	633	599	31	0	664	599
Cumberland	S	32,468	27,530	4,394	2,523	36,862	30,953
	H	451	500	956	334	1,407	834
Hants	S	30,372	44,301	0	260	30,372	44,561
	H	680	71	0	941	680	1,012
Halifax	S	59,939	66,070	75	857	60,014	66,927
	H	4,245	13,738	102	0	4,347	13,738
Kings	S	1,383	2,364	0	0	1,383	2,364
	H	9,559	3,957	0	47	9,559	4,004
All land Tenures							
Colchester	S	594,950	567,933	175,964	254,894	770,914	822,827
	H	44,686	40,810	72,155	90,678	116,841	131,488
Cumberland	S	247,248	270,635	324,747	283,996	571,995	554,631
	H	10,814	14,817	59,219	83,715	70,033	98,532
Hants	S	337,759	454,386	30,328	115,843	368,087	513,438
	H	54,770	47,615	20,441	18,145	75,211	89,511
Halifax	S	555,831	542,657	23,153	38,963	578,984	581,620
	H	44,090	33,851	23,793	27,505	67,883	61,356
Kings	S	233,891	184,927	2,640	27,603	236,531	212,530
	H	26,674	17,476	8,686	19,432	35,359	36,908

Source: (Nova Scotia Department of Natural Resources, 2001c)

APPENDIX L

Resources Industries in the Minas Basin watershed

Agriculture:

Certified Organic Farms in Watershed
Corradini Farm – Windsor
Highland Farm – Newport
Berhnard and Linda Loewen – Upper Kennetcook
Stepping Stone Heritage Farm – Waterville
Stewart Organic Farm – Wolfville

Organic Transitional Farms
Linda Remler and Murray Pickering – Wolfville

Meat Processors
ACA Cooperative Ltd – New Minas*
Allison Mahar – Berwick
Austrian Smokehouse – Truro
Avery McNutt - Nuttby
Brookside Abattoir Ltd. – Bible Hill*
Canada Packers – Kentville
Cecil Reid – Melanson
Charles Connors – Maitland
Char-Vale Charolais Ltd. - Windsor
DG. Church – Brooklyn
Eastern Protein Foods – Kentville*
Ells Farms Ltd. – Canning*
Ernst White – Noel Road *
Gary Ettinger – Martock
Larsen Packers Ltd. – Berwick*
Meehan's Meat Packers Ltd – Upper Rawdon
Rothsay Division (Maple Leaf Mills) – Truro*
The Poultry Company (Maple Leaf Poultry) – Upper Canard
W.G. Oulton and Sons Ltd. – Windsor

Wool Processors
Stanfields Ltd. – Truro*
Handspinners – Truro

Animal Feeds and Grain Processing
Canada Packers – Port Williams
Canada Packers – Truro
Clarence Farm Services – Truro*
Co-op Atlantic – New Minas*
Co-op Atlantic – Newport*
Co-op Atlantic – Truro

Co-op Atlantic – Upper Rawdon
F. Dansart Concentrates Ltd. – Kentville
Mic Mac Feeds Ltd. – Port Williams
S.F. Rendering Ltd. – Port Williams
Scotia Farm Services Ltd. – Kentville
Scott Farm Ltd. – Canning
Shur- Gain – Truro
Shur-Gain – Port Williams
Sun Ray Feed & Farm Supplies – Milford
W.A. Flemming Division Ltd. – Truro*

Milk Processors
Cornwallis Dairy Ltd. – Kentville
Elm Ave. Dairy Ltd. – Elmsdale
Farmer's Co-op Dairy Ltd. – Truro*
Producers Milk Products – Truro
Scotsburn Dairy Group – Truro*

Cheese Makers
Elm Ave. Dairy Ltd. – Elmsdale
Farmer's Co-op Dairy Ltd. – Truro
Holmstead Cheese Sales Ltd. - Nicholsville
That Dutchman – Upper Economy*

Blueberry Buyers and Processors
ACA Co-op Ltd. – Berwick
CL Stonehouse Enterprises – Debert
Cross Roads Blueberry Co-op – Parrsboro
Curtis Erb – Parrsboro
Gordon Slack - Glenhole

Fruit Growers and Shippers
Stirling Apples – Upper Canard
Agri-Growers Ltd. – Greenwich
Blueberry Acres
Dominion Produce Ltd. – Rockwell Mountain Road
Foote Family Farm – Woodville
Franey Farms – Weston
Kings Produce Ltd. – Canning
Mountain Crest Farms – Morristown
Nova Agri Associates –
Sawler Gardens Ltd. – Somerset
Webster Farms Ltd. -

Fruit and Vegetable Processors
ACA Co-operative Ltd. – Berwick*

Avon Food Ltd. – Port Williams*
Can Vin Products Ltd. – Wolfville
Chipman Wines Ltd. – Kentville
Sarsfield Foods Ltd. – Berwick*
Scotian Gold Co-op – Kentville
Scotia Farm Services Ltd. – Kentville
Hostess Frito Lay – Kentville
Webster Farms Ltd. – Cambridge

Fruit Juice
Foote Family – Cambridge
Great Valley Juices Inc. – Coldrook
Suprima Farms – Canning
Sweetripe Drinks Ltd. Allen's – Port Williams

Wine
Andres Wines Atlantic Ltd. – Truro
Habitant Vineyards - Habitant
Grand Pre Winery – Grand Pre
Jost Vineyards – Gaspereau (orchards only)
Pereau Creek Winery - Canning
Saint Famille Wines Ltd. – Falmouth
TelderBerry Wines – Nine Mile River

Honey Processors
Cossman & Whidden Honey Co. - Greenwich
Foote Family Farm Ltd. – Cambridge Station*
Nickerson's Apple Bee Farm – Waterville*
Scotian Gold Co-op Kentville

Fishery:
Fish, Fresh/Frozen/Smoked
Austrian Smokehouse – Truro
Cormier Five Island Clams – Five Islands

Mining:
Fertilizer and Lime Manufacturers
Annapolis Valley Peat Moss Co. Ltd. –
Fundy Fertilizers – Kentville*
Soil Enrichment Ltd. – Port Williams
Truro Agromart – Truro
Valley Fertilizers Ltd. – Coldbrook*

Aggregates
Keddy Aggregate – Coldbrook
Shaw Resources – Shubenacadie

Forestry:

Lumber Companies – Sawn and Timber, Woodchips

Brookfield Lumber Co. Ltd. – Brookfield
Clearwood Lumber Co. – Upper Stewiacke
Clifford Long & Sons Ltd. – White Rock Mills
Clyde A. Payzant Lumber Ltd. – Hantsport
Davison Port-a-mill – Wolfville
E & M Burgess Enterprises – Newport Station
Edwin Blakie Lumber Ltd. – Upper Stewiacke
Emsdale Lumber Co. Ltd. – Elmsdale
Ernest C. Harrison & Sons Ltd. – Parrsboro
Everett & John Rand – Canning
Ghost Hollow Lumber – Parrsboro
Hardwood Edge Lumber Co. – Truro
Julimar Lumber Co. Ltd. – Brookfield
Laurie Isenor & Sons Ltd. – Lantz
Ledwidge Lumber Co. Ltd. – Enfield
M.G. Higgins Lumber Ltd. – Belmont
Marwood Inc. – Brookfield
N.S. W.O.O.D.S. Co-op Ltd. – Truro
Normandy Lumber – Brookfield
Pineo's Mill – Waterville
Pugsley Lumber Ltd. – Lower Five Islands
Russell F. Smith Lumber Ltd. – Windsor
S.G. Levy & Sons Ltd. – Wolfville
Sproule Lumber Ltd. – Truro
The Woodshed of Parrsboro – Parrsboro
Vintage Mouldings Manufacturers – Truro
Russell White Lumber Ltd. – Kennetcook
Wolfville Furniture Co. – Wolfville

Pulp and Paper Mills

Minas Basin Pulp and Paper – Hantsport

Ecoforestry Operations

Maple Creek Organic Farm and Ecoforestry – Scotch Village
The North Mountain Old Forest Restoration and Conservation Group – Canning

Sources: (Nova Scotia Department of Development, 1986; Nova Scotia Organic Growers Association; Nova Scotia Natural Resources; Hants Regional Development Association, April 1998 and November 2000; KCED, 1998; MacNutt, data unknown; Nova Scotia Department of Finance, 2001-2002; Nova Scotia Department of Natural Resources, July 2001;
* - From Nova Scotia Resource Atlas 1986
Italic – was in NS Resource Atlas but not in recent NS Manufacturers or Employers Info

APPENDIX M
Cultural and Natural Significant Areas in Minas Basin watershed

Name	Location	Designation	Significance
Hants County			
Anthony Provincial Park	Lower Selma	Provincial Park: picnic site	Borders Minas Basin directly
Bramber Beach	Bramber	Designated Beach	
Burntcoat Head Lighthouse Park	Walton		Worlds Highest tides recorded, restored lighthouse
Castle Frederick Project	Falmouth	Provincial Archaeological Site	
Cheverie Beach	Cheverie	Designated Beach	
Falls Lake Provincial Park	Smiths Corner	Provincial Park	
Fort Edward National Historic Site	Windsor	National Historic Site	Oldest blockhouse in Canada
Fundy Western Hemisphere Shorebird Reserve	Minas Basin	Hemispheric Shorebird Reserve	
Minas Basin Archaeological Project	Minas Basin	Provincial Archaeological Site	
Mt. Uniacke Provincial Park	Mt. Uniacke	Provincial Park	
Smileys Provincial Park	Brooklyn	Provincial Park: Campground	On Meander River
Southern Bight, Minas Basin		RAMSAR and WHSR designation IBI site	International recognition
The Village of Maitland	Maitland	Heritage Conservation District	
Uniacke Estate Museum Park	Mt. Uniacke	Provincial Historical & Archaeological Site	
Walton Lighthouse and Look-off	Walton		Original lighthouse
Halifax County			
Laurie Provincial Park	Enfield	Provincial Park: campground	
Oakfield Provincial Park	Oakfield	Provincial Park: picnic site	
Waverly Game Sanctuary	Waverly	Game Sanctuary	
Waverly-Salmon River Long Lake Wilderness Area	Waverly	Wilderness Area (NS Dept. of Env.)	Only part of it in watershed
Kings County			
Acadia Nature Trail	Wolfville	Acadia University Campus Trail	

Name	Location	Designation	Significance
Aylesford Lake Beach	South of Kentville		Freshwater Beach
Blomidon Provincial Park (over 500 acres)	Canning	Provincial Park: campground	Beach & Hiking Trails along Cape Blomidon
Blomidon Look off Provincial Park	Canning	Provincial Park: viewing point	
Boot Island	Near Wolfville	National Wildlife Area	
Cape Split	Scots Bay	Recently acquired by Provincial Parks	Coastal Hiking Trail
Coldrook Provincial Park	Coldbrook	Provincial Park: picnic site	
Dewey Creek Wildlife Management Area	Canard	Provincial Wildlife Management Area	
Evangeline Beach	Grand Pre		Migratory shorebirds
Kentville Migratory Bird Sanctuary	Kentville	Federal	Migratory Birds
Fundy Western Hemisphere Shorebird Reserve	Southern Bight of Minas Basin	Hemispheric Shorebird Reserve	International recognition
Grand Pre National Historic Site	Grand Pre	National Historic Site	Acadian Heritage
Horton Bluff	Blomidon	Important Fossil Site	Also Preserved Lighthouse
Kentville Agricultural Centre Ravine	Kentville	Significant Area	Old growth forest, trail
Lake George Provincial Park	Berwick	Provincial Park: Picnic site	Freshwater beach
Lumsden Pond, Provincial Park	White Rock	Provincial Park: picnic site	Freshwater beach
Minas Basin Archaeological Project	Minas Basin	Provincial Archaeological Site	
Minas Basin Wildlife Management Area	Kingsport	Wildlife Management Area	
White Rock Ravine	White Rock	Local	Trail
Scotts Bay Beach	Scotts Bay	Designated Beach	Rock hounding area
Colchester County			
Bass River Heritage Interpretive Park	Bass River		
Cadell Rapids Look-off Provincial Park	Stewiacke	Provincial Park: viewing point	Overlooking Shubenacadie River
Debert Paleo-Indian Site	Debert	NS Special Place: Archaeological Site	Protected Site
Debert Wildlife Management Area	Debert	Wildlife management area	

Name	Location	Designation	Significance
Economy Falls	Economy		Waterfall on Economy River
Economy River Wilderness Area	Near Economy	Wilderness Area (NS Dept. of Env.)	Protected Site
Five Islands Lighthouse	Five Islands		Preserved Lighthouse
Five Islands Provincial Park (over 500 acres)	Economy	Provincial Park: campground	Borders Minas Basin
Londonderry Provincial Park	Londonderry	Provincial Park: campground	
Little Dyke Beach	Debert	Designated Beach	Protected
Lower Debert Beach	Debert	Designated Beach	Protected
Manganese Mines Wildlife Management Area	Near Truro (Riverdale)	Wildlife management area	
McElmons Pond Provincial Park	Belmont	Provincial Park: picnic park	Borders wildlife sanctuary
Portibec Wilderness Area	Near Economy	Wilderness Area (NS Dept. of Env.)	Protected Site
Shubenacadie Tidal Bore Park	Shubenacadie River		
Shubenacadie Canal	Shubenacadie	NS Special Place: History & Archaeology	Protected Site
Shubenacadie Game Sanctuary	Shubenacadie		
Shubenacadie Provincial Wildlife Park	Shubenacadie	Provincial Park: wildlife park	
Shubenacadie Wildlife Management Area	Shubenacadie	Wildlife Management Area	
Thomas' Cove Coastal Reserve	Economy Point	Local	Coastal features
Victoria Park	Truro	Recreation Park	
Cumberland County			
Advocate Beach	Advocate Harbour	Designated Beach	Protected
Cape Chignecto Provincial Park (over 500 acres)	West Advocate	Provincial Park: wilderness park and campground	Borders Minas Basin
Cape d'Or	Cape d'Or		Viewpoint and working lighthouse
Dilligent River	Dilligent River	Important Fossil Site	
Fox Point Beach	Port Greville	Designated Beach	Protected
Fox Point Look-off	Fox Point		Viewpoint
Harrington Beach	Lower Five Islands	Designated Beach	Protected

Name	Location	Designation	Significance
Newille Lake	Parrsboro	Picnic park	
Parrsboro Fossil Site	Parrsboro	NS Special Place : Fossil Site	Protected Site
Port Greville Beach	Port Greville	Designated Beach	Protected
Partridge Island	Parrsboro		Viewpoint and Hiking Trail
Partridge Island Beach	Parrsboro	Designated Beach	Protected
Port Greville Look off	Port Greville		Viewing Point
Riverside Beach	Parrsboro	Designated Beach	Protected
Sand Point Beach	Five Islands	Designated Beach	Protected
Spencer's Island Historic Site	Cape Spencer		Shipbuilding
Wasson Bluff	Two Islands		Fossils
Wards Falls Hiking Trail	Wharton		Hiking Trail

Sources: (Derek Davis, date unknown; Resource Management Associates, December 1999 and January 1999; Service Nova Scotia and Municipal Services, 2001; Willcocks-Musselman, April 2001; Hopper et al, 2000; Nova Scotia Department of Development, 1986; Nova Scotia Department of Natural Resources, 2001a)

APPENDIX N

Water Supply and Treatment Systems in the Minas Basin watershed

- *Data obtained from Nova Scotia Community Infrastructure Needs Database prepared by ABL Environmental Consultants in 1995, obtained from Nova Scotia Municipal Services. Some data may therefore not be up to date*

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Colchester County

Peter Johnson - Engineer with Public Works

The areas within the Minas Basin Watershed are serviced by individual wells except Water Supply Systems listed below:

1. Bible Hill (College Park) (1.1 km distribution)
   - Usage: 100% domestic
   - Average daily flow: 24,869 cu.m/d
   - Source: Groundwater
   - Storage: ground level -19cu.m. capacity

2. Stewiacke (1 km transmission, 4.8 km distribution)
   - Usage: n/a
   - Average daily flow: 386 cu.m/d
   - Source: Surface – St. Andrew's River
   - Stewiacke Water Treatment Facility: infiltration and chlorination
   - Storage: covered elevated reservoir – 454 cu.m capacity

3. Truro (5.85 km transmission, 75.3 km distribution)
   - Usage: primarily domestic
   - Average Daily flow: 10,229 cu.m/d
   - Sources: Surface – Lepper Brook, water is dammed and piped to town in impoundment storage; Ground – six wells pumped directly to mains
   - Truro Water Treatment Facility: screening, oxidation, coagulation, flocculation, PH adjustment, fluoridation and chlorination; clear well storage 4,546 cu.m capacity
   - Storage: Two covered, ground level – 2,273 cu.m and 3,341 cu.m

Cumberland County

The areas within the Minas Basin Watershed are serviced by individual wells except Water Supply Systems listed below:

1. Parrsboro (2.8 km transmission, 6.5 km distribution)
   - Usage: n/a
   - Average daily flow: 909 cu.m/d
   - Sources: Ground – 3 wells
   - Parrsboro Water Treatment Facility: oxidation, PH adjustment, chlorination; clear well storage 4,500 cu.m capacity
   - Storage: ground level uncovered – 4,546 cu.m capacity

Halifax County

The areas within the Minas Basin Watershed are serviced by individual wells except Water Supply Systems listed below:

1. Aerotech Industrial Park and Halifax Airport
    - Usage: 100% commercial
    - Average daily flow: 1,137 cu.m/d
    - Sources: Surface – Bennery Lake
    - Aerotech Water Treatment Facility: screening, coagulation, flocculation, sedimentation, filtration, chlorination, PH adjustment, fluoridation

2. Wellington
    - Usage: n/a
    - Average daily flow: n/a
    - Sources: Surface – Grand Lake
    - Collins Park Water Treatment Facility: screening, filtration, chlorination, PH adjustment
    - Storage: none

Hants - West

Rick Sherrard - Director of Public Works

The areas within the Minas Basin Watershed are serviced by individual wells except Water Supply Systems listed below:

1. Falmouth (2 km of transmission, 22.7 km of distribution)
    - Usage: n/a
    - Average daily flow: 853 cu.m/d
    - Sources: Surface – French Mill Brook (impoundment area)
    - Falmouth Water Treatment Facility: screening and chlorination
    - Storage: elevated, covered – 2,877 cu.m capacity

2. Hansport (Town Owned)
    - Usage: n/a
    - Average daily flow: n/a
    - Sources: Surface – Davison Lake; Ground – 2 wells, water pumped directly to reservoir
    - Hansport Water Treatment Facility: chlorination
    - Storage:

3. Windsor (also services Three Mile Plains) (8.1 km transmission, 12.6 km distribution + 9.5km distribution in Three Mile Plains) (Town Owned)
    - Usage: 63% domestic; 23% commercial; 10% industrial; 6% unaccounted
    - Average daily flows: 2,955 cu.m/d
    - Source: Mill Lakes (four lakes impounded into single lake by dam – Fall Brook carries raw water to reservoir where water is then piped to town)
    - Windsor Water Treatment Facility: screening, PH adjustment, chlorination and fluoridation

- Storage: elevated, covered – 1,409 cu.m

Hants - East

Jim Ashley – Manager of Public Works

The areas within the Minas Basin Watershed are serviced by individual wells except Water Supply Systems listed below:

1. Lantz/Elmsdale/Enfield/ (30.6 km distribution)
    - Usage: n/a
    - Average daily flow: 1,137 cu.m/d
    - Source: Surface – Shubenacadie River
    - Elmsdale Regional Treatment Facility: flocculation, coagulation, filtration and chlorination, PH adjustment and fluoridation
    - Storage: Two elevated, covered – 1,500 and 2,000 cu.m capacities

2. Shubenacadie (1.13 km transmission, 5.15 km distribution)
    - Usage: n/a
    - Average daily flow: 273 cu.m/d
    - Source: Surface – Snider's Lake (spring fed lake)
    - Shubenacadie Water Treatment Facility: flocculation, coagulation, filtration with activated carbon and chlorination/fluoridation
    - Storage: elevated, covered

Kings County

Brian Hazlett - Supervisor Water and Waste Water Kings County

The areas within the Minas Basin Watershed are serviced by individual wells except Water Supply Systems listed below:

1. Town of Kentville Water Supply system (also supplies Stead Subdivision in North Kentville) (6.1 km transmission, 25.8 km distribution)
    - Usage: 48% domestic; 43 % industrial; 9% unaccounted
    - Average daily flow: 3,545 cu.m/d
    - Sources: 2 sources of Ground - McGee Lake Watershed (earthen dam and concrete spillway maintain level in lake, raw water carried to town reservoir), and 2 wells (one on Mee Road and one on Dodge Brook), plus 2 wells in Industrial Park
    - Town of Kentville Treatment Facility: Filtration, sedimentation, chlorination, PH adjustment and fluoridation
    - Storage: two ground level, covered – 2,409 cu.m and 1,363 cu.m capacities, and one ground level, uncovered – 9,092 cu.m capacity

2. Canning (1.2 km transmission, 13.2 km distribution) (operated by Village of Canning)
    - Usage: 71% domestic; 12% commercial; 4 % institutional; 12% unaccounted
    - Average daily flow: 191 cu.m/d
    - Sources: 3 sources of Ground - 2 wells pumped into reservoir and 2 well pumped into mains

- Canning Water Treatment Facility: chlorination
- Storage: ground level, covered – 1,609 cu.m capacity

3. Hants Border (.96 km distribution)
   - Usage: 90% domestic
   - Sources: Town of Hansport Water Supply
   - Storage: uncovered, ground level reservoir

4. New Minas (29.8 km distribution)
   - Usage: 55% domestic; 32% commercial; 13% unaccounted
   - Average daily flow: 1,364 cu.m/d
   - Sources: Ground - 6 wells
   - New Minas Water Treatment Facility: PH adjustment, chlorination
   - Storage: covered, ground level steel tank – 9,092 capacity

5. Port Williams
   - Usage: n/a
   - Average daily flow: n/a
   - Sources: Ground - 2 wells
   - Port Williams Water Treatment Facility: chlorination
   - Storage: covered, ground level – 1,514 cu.m capacity

6. Wolfville (3.6 km transmission, 29.1 km distribution)
   - Usage: n/a
   - Average daily flow: 2,500 cu.m/d
   - Sources: Ground - 2 wells
   - Wolfville Water Treatment Facility: chlorination, PH adjustment; clear well storage – 13,638 cu.m capacity
   - Storage: ground level, covered – 13,638 cu.m

Sources: (Nova Scotia Department of Municipal Affairs, February 1981; Nova Scotia Department of Municipal Affairs, December 1995, Groundwater Section Department of Environment and Labour, April 1967)

APPENDIX O

Waste Water Facilities in the Minas Basin watershed

Colchester County

New main wastewater treatment plant in Truro (replaced 4 plants and 11 direct outfalls) serves Truro and area and central Colchester - secondary treatment
Three smaller treatment plants 1) Brookfield 2) Great Village 3) Debert

Storm Sewers in Minas Basin Watershed
No storm sewers exist in the watershed area of the county unless indicated below. In the remaining areas storm water is channelled into near by rivers by means of roadside ditches and culverts.

1. Truro – 83 km storm sewers, 63km combined storm and sanitary sewers

Sanitary Sewers in the Minas Basin Watershed
Other than the identified areas below, the remainder of the county within the Minas Basin Watershed has individual septic systems

1. Bible Hill Wastewater Collection System
    - Number of Services: 1000
    - Area of Sewershed: n/a
    - Length of sanitary: 34.7km
    - Average daily flow: n/a
    - Usage: n/a
    - Pumped to Truro Regional Wastewater Treatment Plant

2. Brookfield Wastewater Collection System
    - Number of Services: 187
    - Area of Sewershed: n/a
    - Length of sanitary: 7km
    - Average daily flow: n/a
    - Usage: n/a
    - Pumped to Brookfield Wastewater Treatment Plant

3. Colchester Regional Wastewater Collection system (services Bible Hill, East Mountain, Hilden, Mingo's Corner, North River, Salmon River, Truro Heights, Truro and Valley)
    - Area of Sewershed: n/a
    - Length of sanitary: 11km
    - Average daily flow: 17,275 cu.m/d
    - Usage: n/a
    - Pumped to Colchester Regional Wastewater Treatment Plant

4. Great Village Wastewater Collection System
    - Number of Services: 50

- Area of Sewershed: n/a
- Length of sanitary: 1914 km
- Average daily flow: 80 cu.m/d
- Usage: 100% domestic n/a
- Pumped to Great Village Wastewater Treatment Plant

5. Hilden Wastewater Collection System
    - Number of Services: 416
    - Area of Sewershed: n/a
    - Length of sanitary: 13.1 km
    - Average daily flow:
    - Usage: 90% domestic, 10% commercial
    - Pumped to Truro Regional Wastewater Treatment Plant

6. Mingo's Corner Wastewater Collection System
    - Number of Services:48
    - Area of Sewershed: n/a
    - Length of sanitary: 2.4km
    - Average daily flow: n/a
    - Usage: 100% domestic
    - Pumped to Truro Regional Wastewater Treatment Plant

7. North River Wastewater Collection System
    - Number of Services: 206
    - Area of Sewershed: n/a
    - Length of sanitary: 4.5km
    - Average daily flow: n/a
    - Usage: 100% domestic
    - Pumped to Truro Regional Wastewater Treatment Plant

8. Salmon River Wastewater Collection System
    - Number of Services: 627
    - Area of Sewershed: n/a
    - Length of sanitary: 14.5km
    - Average daily flow: n/a
    - Usage: 90% domestic, 10% commercial
    - Pumped to Truro Regional Wastewater Treatment Plant

9. Stewiacke Wastewater Collection System
    - Number of Services: 420
    - Area of Sewershed: n/a
    - Length of sanitary: 9.6km
    - Average daily flow: 613 cu.m/d
    - Usage: 100% domestic
    - Pumped to Stewiacke Waste Water Treatment Plant

10. Truro Wastewater Collection System
    - Number of Services: 3,926
    - Area of Sewershed: n/a
    - Length of sanitary: 146 km plus 63 combined with storm sewers
    - Average daily flow: 9,319 cu.m/d
    - Usage: n/a
    - Pumped Truro Regional Wastewater Treatment Plant

11. Truro Heights Wastewater Collection System
    - Area of Sewershed:
    - Length of sanitary: 12.8km
    - Average daily flow:
    - Usage: 90% domestic, 10% commercial
    - Pumped to Truro Regional Wastewater Treatment Plant

12. Valley/East Mountain Wastewater Collection System
    - Area of Sewershed: n/a
    - Length of sanitary: 24.9km
    - Average daily flow: n/a
    - Usage: 100% domestic
    - Pumped to Truro Regional Wastewater Treatment Plant

Wastewater Treatment Facilities
There are 4 Treatment Facilities:

1. Brookfield Wastewater Treatment Facility
    - Average daily flow: (design capacity is 227 cu.m/d)
    - Number of services: 187
    - Level of Treatment: Secondary – Aerated Lagoon
    - Sludge disposal: Land Application
    - Receiving water: Brook River

2. Colchester Regional Waste Water Treatment Facility
    - Average daily flow: 17,275 cu.m/d
    - Number of services: 3,580
    - Level of Treatment: Tertiary – Sequencing Batch Reactor
    - Sludge disposal: Landfill disposal
    - Receiving water: Salmon River

3. Great Village Wastewater Treatment Facility
    - Average daily flow: 75 cu.m/d
    - Number of services: 50
    - Level of Treatment: Secondary – Extended Aeration
    - Sludge disposal: Land Application (agricultural)
    - Receiving water: Great Village River

4. Stewiacke Wastewater Treatment Facility
- Average daily flow: 613 cu.m/d
- Number of Services: 420
- Level of Treatment: Secondary – Extended Aeration
- Sludge disposal: Contracted Out
- Receiving water: Stewiacke River

Cumberland County

Storm Sewers

No storm sewers exist in the watershed area of the county unless indicated below. In the remaining areas storm water is channelled into near by rivers by means of roadside ditches and culverts.

1. Parrsboro - 0.9 km combined storm and sanitary sewers, empty directly into Parrsboro River

Sanitary Sewers in Minas Basin Watershed

Other than the identified areas below, the remainder of the county within the Minas Basin Watershed has individual septic systems

1. Parrsboro Wastewater Collection System
   - Area of Sewershed: n/a
   - Length of sanitary: 1.8km plus 0.9km combined storm and sanitary
   - Average Daily Flow: n/a
   - Usage: 85% domestic, 15% infiltration
   - Effluent discharges directly into Parrsboro River

Wastewater Treatment Facilities in Minas Basin Watershed

There are no wastewater Treatment Plants in the Minas Basin Watershed

Halifax County

Storm Sewers in the Minas Basin Watershed

Unknown numbers of sewers exist in the watershed area of the county. In the remaining areas storm water is channelled into near by rivers by means of roadside ditches and culverts.

Sanitary Sewers in Minas Basin Watershed

Other than the identified areas below, the remainder of the county within the Minas Basin Watershed has individual septic systems

1. Aerotech Wastewater Collection System (services Halifax Airport and Aerotech Industrial Park)
   - Number of Services: n/a
   - Area of Sewershed: 750 ha
   - Length of sanitary: 7 km
   - Average Daily Flow: 682 cu.m/d

- Usage: 90% commercial, 10% infiltration
- Pumped to Wastewater Treatment Plant

2. Frame Subdivision Wastewater Collection System (services Waverly)
   - Number of Services: n/a
   - Area of Sewershed: n/a
   - Length of sanitary: n/a
   - Average Daily Flow: n/a
   - Usage: n/a
   - Pumped to Frame Subdivision Wastewater Treatment Plant

3. Lockview/MacPherson Wastewater Collection System (services Fall River)
   - Number of Services: n/a
   - Area of Sewershed: n/a
   - Length of sanitary: n/a
   - Average Daily Flow: n/a
   - Usage: n/a
   - Pumped to Lockview/MacPherson Wastewater Treatment Plant

4. Springfield Lake Wastewater Collection System
   - Number of Services: n/a
   - Area of Sewershed: n/a
   - Length of sanitary: 12.2 km
   - Average Daily Flow: n/a
   - Usage: n/a
   - Pumped to Springfield Lake Wastewater Treatment Plant

5. Steeves Subdivision Wastewater Collection System (Services Wellington)
   - Number of Services: n/a
   - Area of Sewershed: n/a
   - Length of sanitary: n/a
   - Average Daily Flow: n/a
   - Usage: n/a
   - Pumped to Steeves Subdivision Wastewater Treatment Plant

Wastewater Treatment Facilities

1. Aerotech Wastewater Treatment Plant
   - Average daily flow: 455 cu.m/d
   - Number of Services: n/a
   - Level of Treatment: Secondary – Rotating Biological Contractor
   - Sludge disposal: Septage Lagoon
   - Receiving water: Johnson Brook

2. Aerotech Septage Lagoons (services County of Halifax)
   - Average daily flow: 81 cu.m/d

- Population Served: 135,000
- Level of Treatment: Primary – Sludge Lagoon
- Receiving water: discharged to Aerotech Wastewater Treatment Plant

3. Frame Subdivision Wastewater Treatment Plant
   - Average daily flow: n/a
   - Number of Services: n/a40
   - Level of Treatment: Secondary – Extended Aeration
   - Sludge disposal: Septage Lagoon
   - Receiving water: Lake Thomas

4. Lockview/MacPherson Wastewater Treatment Plant
   - Average daily flow: 405 cu.m/d
   - Number of Services: n/a
   - Level of Treatment: Tertiary – Extended Aeration
   - Sludge disposal: Septage Lagoon
   - Receiving water: Fletchers Lake

5. Springfield Lake Wastewater Treatment Plant
   - Average daily flow: 318 cu.m/d
   - Number of Services: n/a
   - Level of Treatment: Secondary – Extended Aeration
   - Sludge disposal: Septage Lagoon
   - Receiving water: Sackville River

6. Steeves Subdivision Wastewater Treatment Plant
   - Average daily flow: n/a
   - Number of Services: n/a
   - Level of Treatment: Secondary – Extended Aeration
   - Sludge disposal: Septic Lagoon
   - Receiving water: Fletchers Lake

Hants -West

Rick Sherrard - Director of Public Works

Storm Sewers in Minas Basin Watershed

No storm sewers exist in the watershed area of the county unless indicated below. In the remaining areas storm water is channelled into near by rivers by means of roadside ditches and culverts.

1. Hantsport – separate and combined storm and sanitary sewers

2. Windsor – 3 km of storm sewers, 14 km combined storm and sanitary sewers

Sanitary Sewers in Minas Basin Watershed

Other than the identified areas below, the remainder of the county within the Minas Basin Watershed has individual septic systems

1. Falmouth

- Number of Services: 389
- Area of Sewershed: 1027 ha
- Length of sanitary: 17.7 km
- Average Daily Flow: 282 cu.m/d
- Usage: 90% domestic, 5% industrial, 5% infiltration
- Pumped to Falmouth Wastewater Treatment Plant

2. Hantsport Wastewater Collection System
   - Number of Services: n/a
   - Area of Sewershed: n/a
   - Length of sanitary: 7.7 km
   - Average Daily Flow: n/a
   - Usage: n/a
   - Pumped to Hantsport Wastewater Treatment Plant

4. Three Mile Plains Wastewater Collection System
   - Number of Services: 487
   - Area of Sewershed: 570 ha
   - Length of sanitary: 22.8 km
   - Average Daily flow: 577 cu.m/d
   - Usage: 90% domestic, 5% commercial, 5% infiltration
   - Pumped to Windsor Wastewater Treatment Facility

5. Windsor Wastewater Collection System (half of Town)
   - Number of Services: 377
   - Area of Sewershed: 379 ha
   - Length of sanitary: 28.3 km, 14km combined storm and sanitary sewers
   - Average Daily Flow: 6,410
   - Usage: 60% domestic, 28% commercial, 12% industrial
   - Half pumped to Windsor Wastewater Treatment Plant, the other half has direct outfall into Avon River

Wastewater Treatment Facilities

There are 3 Treatment Facilities:

1. Falmouth Wastewater Treatment Facility
   - Average daily flow: n/a
   - Number of Services: 389
   - Level of Treatment: Secondary – Oxidation ditch
   - Sludge disposal: Land application (agricultural)
   - Receiving water: Avon River

2. Hantsport Wastewater Treatment Facility (Run by Town)
   - Average daily flow: n/a
   - Population served: n/a
   - Level of Treatment: n/a
   - Sludge disposal: n/a

- Receiving water: Avon River

3. Windsor Wastewater Treatment Facility (Run by Town)
    - Average daily flow: 1,683 cu.m/d
    - Population served: n/a
    - Level of Treatment: Secondary- Aerated Lagoon
    - Sludge disposal: none
    - Receiving water: Tregothic Creek

Hants -East

Jim Ashley – Manager of Public Works

Storm Sewers in Minas Basin Watershed

No storm sewers exist in the watershed area of the county. Storm water is channelled into near by rivers by means of roadside ditches and culverts.

Sanitary Sewers in Minas Basin Watershed

Other than the identified areas below, the remainder of the county within the Minas Basin Watershed has individual septic systems

1. Lantz Regional Wastewater Collection System (also services Elmsdale and Enfield)
    - Area of Sewershed: n/a
    - Length of sanitary: approximately 25km
    - Average Daily Flow: 1,364 cu.m/d
    - Usage: 90% domestic, 10% commercial
    - Pumped to Lantz Regional Wastewater Treatment Facility

2. Milford Wastewater Collection System
    - Area of Sewershed: n/a
    - Length of sanitary: n/a
    - Average daily flow: n/a
    - Usage: 95% domestic, 5% commercial
    - Pumped to Milford Wastewater Treatment Facility

3. Shubenacadie Wastewater Collection System
    - Area of Sewershed: n/a
    - Length of sanitary: 8.2 km
    - Average daily flow: n/a
    - Usage: 95% domestic, 5% commercial
    - Pumped to Shubenacadie Wastewater Treatment Facility

Wastewater Treatment Facilities

There are 4 Treatment Facilities:

1. Lantz Wastewater Treatment Plant
    - Average daily flow: 1,364 cu.m/d

- Population served: n/a
- Usage: 90% domestic, 10% commercial
- Level of Treatment: Secondary - Facultative lagoon
- Sludge disposal: n/a
- Receiving water: Shubenacadie River

2. Milford Wastewater Treatment Plant
    - Average daily flow: n/a
    - Population served: 450
    - Level of Treatment: Secondary – Extended aeration
    - Sludge disposal: Landfill disposal
    - Receiving water: Shubenacadie River

3. Shubenacadie Wastewater Treatment Plant
    - Average daily flow: n/a
    - Population served: 700
    - Level of Treatment: Secondary – Oxidation ditch
    - Sludge disposal: Lagoon (Lantz)
    - Receiving water: Shubenacadie River

Kings County

Brian Hazlett - Supervisor Water and Waste Water

There are 16 sewage collection systems with 8 wastewater treatment plants (6 aerated lagoons, 1 activated sludge process, 1 sequential batch reactor process) owned and operated by the County of Kings. There are 68 pumping stations in the county
Since 1978 all waste water treated.

Storm Sewers in Minas Basin Watershed

No storm sewers exist in the watershed area of the county unless indicated below. In the remaining areas storm water is channelled into near by rivers by means of roadside ditches and culverts.

1. Berwick – 5.2 km storm sewers

2. Wolfville – 13 km storm sewers

Sanitary Sewers in Minas Basin Watershed

(290km of collector and force main piping)
Other than the identified areas below, the remainder of the county within the Minas Basin Watershed has individual septic systems

1. Aldershot (and North Kentville) Wastewater Collection System
    - Number of Services:
    - Area of Sewershed: n/a
    - Length of sanitary: 13.7 km
    - Average Daily Flow: 853 cu.m/d

- Usage: 95% domestic, 5% commercial
- Pumped to Aldershot Wastewater Treatment Plant

2. Berwick Wastewater Collection System (9.7 miles of sanitary sewer)
    - Number of Services: n/a
    - Area of Sewershed: 417 ha
    - Length of sanitary: 19.9 km
    - Average Daily Flow: 2,271 cu.m/d
    - Usage: 30% domestic, 5% commercial, 50% industrial, 5% institutional, 10% infiltration
    - Pumped to Berwick Wastewater Treatment Plant

3. Canning/Kingsport Wastewater Collection System
    - Number of Services: n/a
    - Area of Sewershed: n/a
    - Length of sanitary: 11.4 km
    - Average Daily Flow: n/a
    - Usage: 95% domestic
    - Pumped to Canning Wastewater Treatment Plant

4. Cambridge Wastewater Collection System
    - Number of Services: n/a
    - Area of Sewershed: n/a
    - Length of sanitary: 2.6 km
    - Average Daily Flow: n/a
    - Usage: 95% domestic
    - Pumped to Waterville Wastewater Treatment Plant

5. Centreville Wastewater Collection System
    - Number of Services: n/a
    - Area of Sewershed: n/a
    - Length of sanitary: 10.6 km
    - Average Daily Flow: n/a
    - Usage: 99% domestic
    - Pumped to Aldershot Wastewater Treatment Plant

6. Coldbrook Wastewater Collection System
    - Number of Services: n/a
    - Area of Sewershed: n/a
    - Length of sanitary: n/a
    - Average Daily Flow: n/a
    - Usage: 60% domestic, 15% commercial, 25% industrial
    - Pumped to New Minas Wastewater Treatment Plant

6. Grand Pre Wastewater Collection System
    - Number of Services: 100

- Area of Sewershed: n/a
- Length of sanitary: 3 km
- Average Daily Flow: n/a
- Usage: 99% domestic
- Pumped to Wolfville Wastewater Treatment Plant

7. Greenwich Wastewater Collection System
   - Number of Services: n/a
   - Area of Sewershed: n/a
   - Length of sanitary: n/a
   - Average Daily Flow: n/a
   - Usage: 95% domestic
   - Pumped to New Minas Regional Wastewater Treatment Plant

7. Hants Border Wastewater Collection System
   - Number of Services: n/a
   - Area of Sewershed: n/a
   - Length of sanitary: 3.9 km
   - Average Daily Flow: 757 cu.m/d
   - Usage: 50% domestic, 20% commercial, 30% industrial
   - Pumped to Hants Border Wastewater Treatment Plant

8. Kentville Wastewater Collection System
   - Number of Services: 2500
   - Area of Sewershed: n/a
   - Length of sanitary: n/a
   - Average Daily Flow: 3,182 cu.m/d
   - Usage: 50% domestic, 30% industrial, 20% infiltration
   - Pumped to New Minas Regional Wastewater Treatment Plant

9. Port Williams Wastewater Collection System
   - Area of Sewershed: n/a
   - Length of sanitary: 7.9 km
   - Average Daily Flow: 397 cu.m/d
   - Usage: 50% domestic, 50% industrial
   - Pumped to Port Williams Wastewater Treatment Plant

10. Waterville/Cambridge Wastewater Collection System
    - Area of Sewershed: n/a
    - Length of sanitary: 4 km
    - Average Daily Flow: 814 cu.m/d
    - Usage: 50% domestic, 5% commercial, 35% industrial, 10% institutional
    - Pumped to Waterville Wastewater Treatment Plant

11. Wolfville Wastewater Collection System
    - Number of Services: 1100

- Area of Sewershed: 405 ha
- Length of sanitary: 27 km
- Average Daily Flow: 2,273 cu.m/d
- Usage: n/a
- Pumped to Wolfville Wastewater Treatment Plant

Treatment Facilities

There are nine Wastewater Treatment Plants in Minas Basin Watershed (others in Kingston, Greenwood and Aylesford)

1. Aldershoot Wastewater Treatment Plant
   - Average daily flow: 567 cu.m/d
   - Population served: n/a
   - Level of Treatment: Secondary – Lagoon
   - Sludge disposal: none
   - Receiving water: Canard River

2. Berwick Wastewater Treatment Plant
   - Average daily flow: 2,271 cu.m/d
   - Population served: 2315
   - Level of Treatment: Secondary – Aerated Lagoon
   - Sludge disposal: none
   - Receiving water: Cornwallis River

3. Canning Wastewater Treatment Plant
   - Average daily flow: n/a
   - Population served: n/a
   - Level of Treatment: Secondary – Lagoon
   - Sludge disposal: none
   - Receiving water: Habitant Creek

4. Hants Border Wastewater Treatment Plant
   - Average daily flow: 870 cu.m/d
   - Population served: n/a
   - Level of Treatment: Secondary - Lagoon
   - Sludge disposal: none
   - Receiving water: Avon River

5. New Minas Wastewater Treatment Plant
   - Average daily flow: 9,085 cu.m/d
   - Population served: 10,000
   - Level of Treatment: Secondary – Lagoon
   - Sludge disposal: none
   - Receiving water: Cornwallis River

6. Port Williams Wastewater Treatment Plant
   - Average daily flow: 397 cu.m/d

- Population served: 1000
- Level of Treatment: Secondary – Lagoon
- Sludge disposal: none
- Receiving water: Cornwallis River

7. Waterville Wastewater Treatment Plant
    - Average daily flow: n/a
    - Population served: 1500
    - Level of Treatment: Secondary – Lagoon
    - Sludge disposal: none
    - Receiving water: Cornwallis River

8. Wolfville Wastewater Treatment Plant
    - Average daily flow: 2,273 cu.m/d
    - Number of Services: 1100
    - Level of Treatment: Primary – Lagoon
    - Sludge disposal: Lagoon
    - Receiving water: Minas Basin

Sources: (Nova Scotia Department of Municipal Affairs, February 1981; Nova Scotia Department of Municipal Affairs, December 1995, Groundwater Section Department of Environment and Labour, April 1967)