# Environmental Impact Statement

## Long Harbour Commercial Nickel Processing Plant

## Volume 3

## Socio-Economic Environment

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# 1.0 Introduction

Volume 3 discusses the socio-economic effects of the Long Harbour Commercial Nickel Processing Plant Project (the Project). The primary focus of the assessment is the set of socio-economic Valued Ecosystem Components (VECs) identified in the Environmental Assessment Guidelines (NLDEC 2006d) and confirmed through community consultations:

- Employment, Training, Economy and Business;
- Services and Infrastructure;
- Recreational Activities; and
- Commercial Fisheries and Aquaculture.

The assessment begins with an overview of existing conditions, to set the context for the Project. This information, together with existing knowledge gained from previous industrial projects in the Province and elsewhere, and information about other projects that might occur concurrently, provides the basis for the identification of potential interactions between the Project and each VEC. Project-specific effects are then considered for each of the VECs, including optimization measures that could be implemented to create or enhance positive effects and avoid or mitigate negative ones.

Any residual effects are then evaluated against defined criteria that consider the direction, magnitude, geographic extent and duration of those effects, together with the level of confidence in the evaluation ratings and likelihood of occurrence. The assessment also examines the effects of potential accidents, including a marine-based or terrestrial-based spill of hazardous materials and a chlorine gas leak affecting the local airshed.

The assessment of the effects on each VEC ends with a discussion of any follow-up monitoring of Project effects, and the volume concludes with a summary of the significance of effects for each VEC.

## 1.1 Project Description

A full description of the Project is provided in Volume 1. This section summarizes those Project characteristics of particular relevance to the socio-economic assessment.

### 1.1.1 Project Location

The Project is located at Long Harbour, on the east side of Placentia Bay. The town of Long Harbour-Mount Arlington Heights is situated on the north side of Long Harbour, approximately 2 km by road from the Project site (see Figure 1.1). The site is partially a brown-field site, as it will include the port facilities of the former Albright and Wilson Americas Limited (AWA) phosphorus reduction plant (Tier 1 Port Site), and partially a green-field site above and to the south, where the processing plant will be located (Tier 2 Plant Site). The access road to the Plant Site and the land proposed for facilities are owned by the Government of Newfoundland and Labrador. The Tier 1 Site is owned by Rhodia Canada,

Ltd., and the Long Harbour Development Corporation. A portion of the AWA site is leased to Marex, which has been demolishing the old facilities. Marex also uses the existing wharf to receive salt for distribution around the province. Newco Metals, a scrap metal dealer, also operates at the Plant Site.


**Figure 1.1 Project Location**

Access by water will be via the existing wharf, which will be upgraded. The existing road to the Port Site will be upgraded, and a new 3-km road will connect Tier 1 and Tier 2. Electricity will be supplied from the provincial grid.

### 1.1.2 Project Phases

The Project includes Planning, Construction, Operation and Decommissioning phases. Planning is currently underway. Construction will take an estimated 42 months, commencing in 2008 (Year 1 of Construction) and reaching completion by end of the summer 2011 (Year 4). At peak, in Year 3, an estimated 1,700 workers will be involved in the Mechanical, Piping, Electrical, Instrumentation and Controls phase of construction.

Operational training to support start-up is scheduled to begin in early 2010. Operations will commence by fall 2011 and employ about 400 persons in a two-shift system. The plant will operate 24 hours a day. Current plans are to decommission the plant starting in 2026.

### 1.1.3 Construction

Vale Inco NL will provide high-quality 500-person accommodations in support of Construction, a decision driven largely by the need to house out-of-province construction workers and those who live outside the immediate area.

Temporary facilities for water and sewer services will be provided for all workers during the construction phase. Potable water will be provided and distributed to key points around the site as construction evolves. All septic waste will be collected and transported off site and disposed of in an approved disposal site by a licensed contractor. The construction accommodation complex will have its own water supply and sewage treatment system.

Domestic solid waste from the Project Site and the construction accommodations will be collected, stored, removed, and disposed of in a licensed landfill site. Construction-related materials such as cardboard, wood, scrap steel and metal, and tires will be collected and offered for recycling. All materials not recycled will be disposed of in an approved facility.

Road traffic during construction will include workers commuting to the site and deliveries of materials such as steel, concrete and a variety of consumables. At peak (Year 3), the anticipated daily traffic volume is projected at 1,522 vehicles.

### 1.1.4 Operations

Bulk nickel concentrate, fine and coarse limestone, and cargo in packages, pallets or bulk form (dry or liquid), containers of reagents, sulphuric acid and general cargo will be delivered to the site by sea. For the Hydromet Plant there will be up to 25 shipments per year, using vessels up to 32,000 DWT. For the Matte Plant, 14 to 16 major shipments per year would be anticipated.

Other material requirements such as miscellaneous supplies and consumables, including fuel oil and diesel fuel, will be delivered by road. Given the continuous nature of the operations, site workers, contractors and visitors will generate an estimated 300 vehicle movements per day to and from the site. Material deliveries and product and waste shipping are expected to produce regular but modest levels of road traffic.

### 1.1.5 Decommissioning and Closure

At the end of the operating life of the Project, the facility will be closed and rehabilitative measures taken to ensure that the site and the surrounding area are returned to an environmentally appropriate condition. The residue storage pond and associated infrastructure will be subject to long-term environmental monitoring, inspection, and maintenance Post-Closure. The duration of monitoring will be determined at decommissioning, following an assessment of the site and consultation with the appropriate regulatory authorities.

# 2.0 Existing Socio-Economic Environment

The following sub-sections outline the socio-economic context of the Study Area, the region and the province in terms of demography and economy. Further information is provided in the VEC assessments and the Socio-Economic Component Study (JWL 2007a). The data presented are the most recent available at the time of writing.

The spatial boundaries for the assessment are discussed in detail in Section 3.3.2. The Study Area is the area that will experience the greatest effects of the Project on the socio-economic VECs. It approximates a 50-km highway distance commute zone around the Project Site, and combines Statistics Canada census sub-divisions 1A, 1B, 1X, and 1Y. The 'Region' refers to the larger area around the Study Area and comprises provincial Economic Zones 15, 17 and 18.

## 2.1 Demography

In 2006, the population in the Study Area was 12,257, the lowest it has been in 20 years (Figure 2.1). Between 1996 and 2006 the population declined by approximately 18 per cent, while the population for the Province fell by only 8.4 per cent (Statistics Canada, 1986; 1996; 2006a).

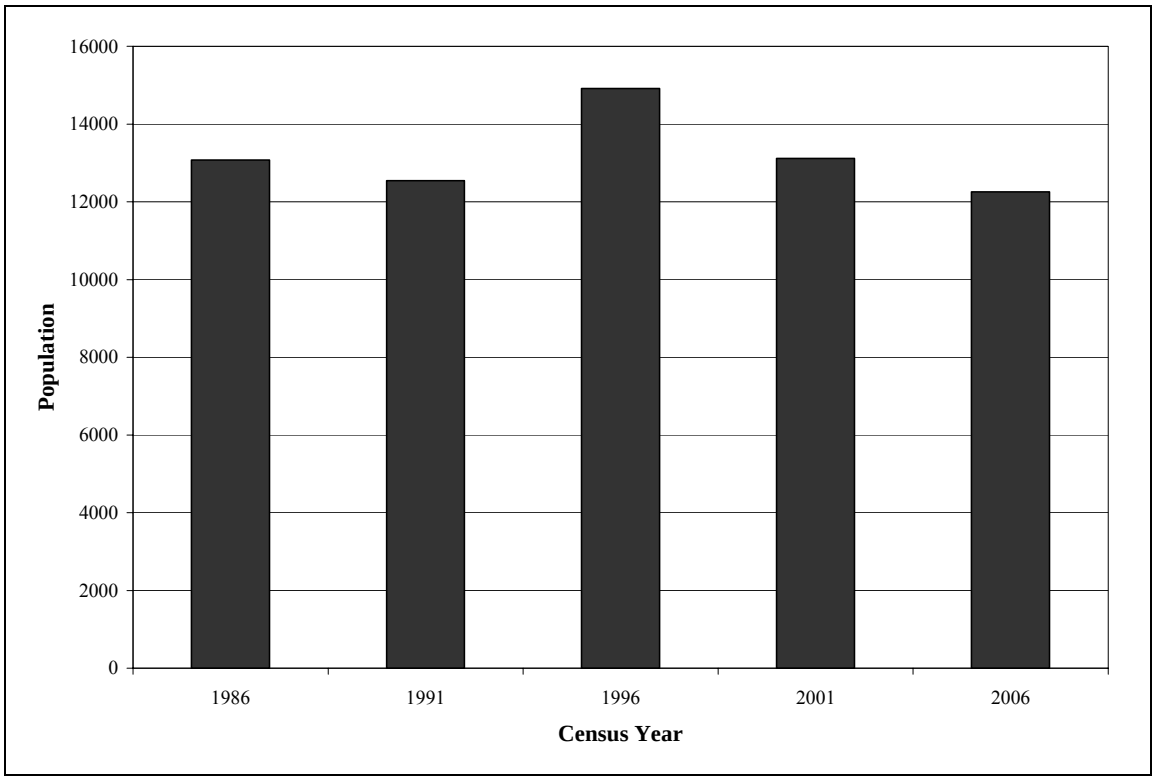


**Figure 2.1 Population of Study Area, 1986 to 2006**

**Source:** Statistics Canada (1986; 1991; 1996; 2001; 2006).

Between 1993 and 2005, 9,440 children were born in the Region and 9,840 residents died, giving an overall natural population decline of 400. The net population change, 1993 to 2001, was further decreased by out-migration.

### 2.1.1 Migration

Out-migration has been a characteristic of Newfoundland and Labrador for many years. Historically, it has been compensated by natural population growth (high birth rates relative to death rates). However, in recent years the province has begun to experience natural population decline, with deaths exceeding births (Department of Human Resources, Labour and Employment, 2007a).

Most out-migrants are drawn to employment opportunities, particularly in Ontario and Alberta. In 2001, more than 70,000 people from Newfoundland and Labrador were living in different communities from those they inhabited in 1996; of these, approximately 65 per cent had left the province. Young workers are generally more likely than older workers to move away; however, between the late 1990s and 2003 the migration rate amongst older workers (45 to 64 years) steadily increased while that of youth decreased, and since 2003 there has been a sharp increase in overall migration (both in and out) among all age groups. From 2002 to 2006, youth (15 to 29 years) accounted for 88 per cent of net out-migration of working-age people (Department of Human Resources, Labour and Employment, 2007a). Although net out-migration increased slightly in 2005 and 2006, levels are still well below those observed in the mid-1990s (Department of Human Resources, Labour and Employment, 2007b).

The education level of migrants has also increased since 1986. Between 1986 and 1991, and 1996 and 2001, the proportion of net out-migrants with post-secondary education increased from 42 per cent to 56 per cent. The top occupations for out-migrants include sales and service occupations (13.2%), secretarial and clerical (12.2%), non-fishery related processing and manufacturing (8.1%), equipment operators and labourers (8.0%), and other trade, transport and equipment operations (5.7%) (Department of Human Resources, Labour and Employment, 2007a).

### 2.1.2 Age

The age distribution of Study Area and provincial residents is shown in Figure 2.2. In 2006, there were 1,695 people in the Study Area under the age of 14; 8,560 between the ages of 15 and 64; and 2,020 over the age of 65. It had a greater proportion of people in the 35-64 and 65+ age groups, but fewer in the younger age categories.

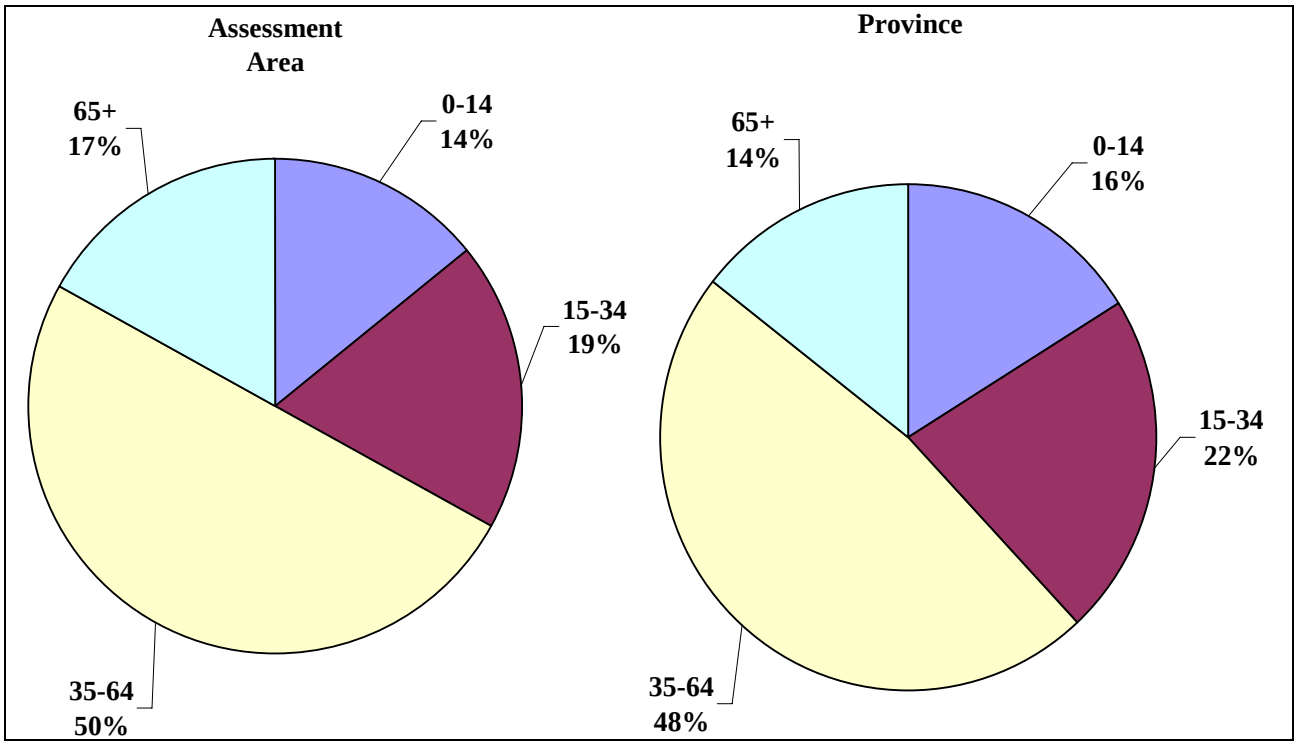


**Figure 2.2 Age Distribution, Study Area and Province, 2006**

**Source:** Statistics Canada (2006a).

The dependency rate measures the ratio of a population composed of people who are generally too old or too young be in the labour force, relative to the number of working age. It is calculated as the number of individuals 15 and under and 65 and older, divided by the number between 16 and 64. A rising dependency rate is common in areas with an aging population. In 2001, the highest dependency ratio in the Study Area was in Placentia (48%), the lowest rate was in Chance Cove (28%) and the rate as a whole (45%) was similar to that for the province (44.6%).

### 2.1.3 Families

The number of census families in the Study Area decreased from 4,140 in 1996 to 3,875 in 2006. The number of private households also fell over the same period, from 4,905 to 4,875.

In 2006, single-parent families comprised 14.5 per cent of all families in the Study Area, up from 14 per cent in 2001. The number of single-parent families decreased slightly in the 10-year period 1986 to 1996, but increased by 115 between 1996 and 2006 (Table 2.1). In all census years, the majority of single-parent families were headed by females and lived in Placentia (Statistics Canada 1986, 1996, 2001, 2006a).

**Table 2.1 Single-Parent Families, by Gender, Study Area and Province**

| | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | **1986** | **1996** | **2006** | **1986** | **1996** | **2006** |
| **Study Area** | 100 | 105 | 105 | 335 | 340 | 455 |
| **Province** | 3,190 | 3,245 | 4,420 | 12,640 | 17,235 | 19,740 |

**Source:** Statistics Canada (1986; 1996; 2006a).

## 2.2 Provincial Economy

For many years Newfoundland and Labrador had the slowest growing economy in Canada, a situation aggravated between the late 1980s and the early 1990s by the Closure of the groundfish fishery. The performance of the provincial economy today is a dramatic contrast to the situation that prevailed then, largely as a result of the growth of the offshore oil and gas sector and, more recently, the start of mineral production at Voisey's Bay. The impetus of these projects was felt first during the construction phase, which began with Hibernia in the early 1990s. The construction activity associated with Hibernia, Terra Nova, White Rose and Voisey's Bay was a period of large capital investments in the provincial economy and a considerable source of employment.

The production from these projects is the province's primary economic driver, and the reason why the economy of Newfoundland and Labrador has been one of the fastest growing in Canada. This is reflected in the provincial Gross Domestic Product (GDP) (Table 2.2), which in most years since 2000 has shown double-digit annual rates of growth. The mineral production and offshore oil production sectors are, however, highly capital-intensive; as a result, the corresponding growth in employment, while significant, has not kept pace with the level of growth in GDP, and the unemployment rate in Newfoundland and Labrador remains the highest in Canada.

Unemployment has significant regional characteristics. In the St. John's Census Metropolitan Area (CMA) the unemployment rate at 7.4 per cent (three-month moving average ending February 2007-Statistics Canada 2007a) is comparable to that in the rest of Canada (6.9%), while in rural Newfoundland and Labrador it is much higher (Table 2.3). This indicates a changing structure in the provincial economy away from rural, labour-intensive, resource-based activities to highly capital-intensive, concentrated, resource-based activities.

The following sub-sections describe several of the most important sectors in the provincial economy: mining, offshore oil and gas production, newsprint, the fishery, tourism and construction.

## Table 2.2 Selected Economic Indicators, Newfoundland and Labrador, 1995 to 2007

| Economic Indicators | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006p | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Population as of July 1 (000's) | 567.4 | 559.8 | 551 | 539.9 | 533.4 | 528 | 522 | 519.4 | 518.5 | 517.3 | 514 | 509.7 | - |
| *% Change* | | *-1.3* | *-1.6* | *-2.0* | *-1.2* | *-1.0* | *-1.1* | *-0.5* | *-0.2* | *-0.2* | *-0.6* | *-0.8* | |
| GDP at market prices ($000) | 10,652 | 10,417 | 10,533 | 11,176 | 12,184 | 13,922 | 14,179 | 16,457 | 18,186 | 19,473 | 21,486 | 24,897 | - |
| *% Change* | | *-2.2* | *1.1* | *6.1* | *9.0* | *14.3* | *1.8* | *16.1* | *10.5* | *7.1* | *10.3* | *15.9* | |
| Personal income ($000) | 10,130 | 9,972 | 9,963 | 10,239 | 10,651 | 11,122 | 11,576 | 11,927 | 12,447 | 12,835 | 13,316 | 15,919 | - |
| *% Change* | | *-1.6* | *-0.1* | *2.8* | *4.0* | *4.4* | *4.1* | *3.0* | *4.4* | *3.1* | *3.7* | *19.5* | |
| Per capita personal income ($) | 17,853 | 17,814 | 18,082 | 18,965 | 19,983 | 21,064 | 22,176 | 22,981 | 24,029 | 24,826 | 25,907 | 31,234 | - |
| *% Change* | | *-0.2* | *1.5* | *4.9* | *5.4* | *5.4* | *5.3* | *3.6* | *4.6* | *3.3* | *4.4* | *20.6* | |
| Transfer payments ($ million) | - | - | 2,470 | 2,464 | 2,358 | 2,358 | 2,497 | 2,584 | 2,638 | 2,685 | 2,745 | 2,837 | - |
| *% Change* | | | | *-0.2* | *-4.3* | *0.0* | *5.9* | *3.5* | *2.1* | *1.8* | *2.2* | *3.4* | |
| Labour force, annual average (000s) | 237.1 | 231.7 | 230.9 | 234.3 | 241.9 | 237.8 | 242.7 | 248.5 | 254.1 | 254.3 | 252.5 | 253.1 | - |
| *% Change* | | *-2.3* | *-0.3* | *1.5* | *3.2* | *-1.7* | *2.1* | *2.4* | *2.3* | *0.1* | *-0.7* | *0.2* | |
| Employment, annual average (000s) | 194.4 | 187.5 | 188.3 | 192.4 | 201 | 198 | 203.8 | 207.2 | 212.3 | 214.3 | 214.1 | 215.7 | - |
| *% Change* | | *-3.5* | *0.4* | *2.2* | *4.5* | *-1.5* | *2.9* | *1.7* | *2.5* | *0.9* | *-0.1* | *0.7* | |
| Unemployment rate, annual average (%) | 18 | 19.1 | 18.4 | 17.9 | 16.9 | 16.7 | 16.1 | 16.7 | 16.5 | 15.7 | 15.2 | 14.8 | - |
| *% Change* | | *6.1* | *-3.7* | *-2.7* | *-5.6* | *-1.2* | *-3.6* | *3.7* | *-1.2* | *-4.8* | *-3.2* | *-2.6* | |
| Consumer price index (1997 = 100) | 89 | 90.4 | 92.3 | 92.5 | 93.8 | 96.6 | 97.7 | 100 | 102.9 | 104.8 | 107.6 | 109.5 | - |
| *% Change* | | *1.6* | *2.1* | *0.2* | *1.4* | *3.0* | *1.1* | *2.4* | *2.9* | *1.8* | *2.7* | *1.8* | |
| Newsprint shipments (thousands of metric tonnes) | 734.7 | 713.7 | 740.9 | 569.8 | 722.2 | 807.8 | 745.8 | 740.3 | 780.9 | 731.7 | 761.8 | 594.8 | - |
| *% Change* | | *-2.9* | *3.8* | *-23.1* | *26.7* | *11.9* | *-7.7* | *-0.7* | *5.5* | *-6.3* | *4.1* | *-21.9* | |
| Value of fish landings ($Millions) | 329.8 | 263.9 | 308.8 | 384.4 | 509.3 | 570.7 | 487.2 | 505.4 | 575.6 | 606.1 | 461.3 | | - |
| *% Change* | | *-20.0* | *17.0* | *24.5* | *32.5* | *12.1* | *-14.6* | *3.7* | *13.9* | *5.3* | *-23.9* | *-100.0* | |
| Value of mineral shipments ($Millions) | 881.5 | 911.3 | 1,010.1 | 1,095.8 | 821.1 | 974.2 | 754.2 | 795.6 | 776.4 | 672.7 | 1,549.2 | 2,535.4 | 3,304.6 |
| *% Change* | | *3.4* | *10.8* | *8.5* | *-25.1* | *18.6* | *-22.6* | *5.5* | *-2.4* | *-13.4* | *130.3* | *63.7* | *30.3* |
| Value of iron ore shipments ($000) | - | 799.3 | 919.4 | 1,026.5 | 760.5 | 902.1 | 691.6 | 728.9 | 720.4 | 624.7 | 1,286.8 | 1,326.3 | 1,381.5 |
| *% Change* | | | | *11.6* | *-25.9* | *18.6* | *-23.3* | *5.4* | *-1.2* | *-13.3* | *106.0* | *3.1* | *4.2* |
| Value of manufacturing shipments ($000) | - | - | - | - | 183,388 | 208,646 | 205,649 | 211,440 | 215,320 | 212,045 | 195,427 | 175,214 | - |
| *% Change* | | | | | | *13.8* | *-1.4* | *2.8* | *1.8* | *-1.5* | *-7.8* | *-10.3* | |
| Oil production (millions of barrels)* | - | - | 1.3 | 23.8 | 36.4 | 52.8 | 54.3 | 104.3 | 123 | 114.8 | 111.3 | 110.9 | |
| *% Change* | | | | *1730.8* | *52.9* | *45.1* | *2.8* | *92.1* | *17.9* | *-6.7* | *-3.0* | *-0.4* | *-100.0* |

| Economic Indicators | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006p | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Public and private capital investment ($Millions) | 2,984.3 | 2,457.2 | 2,788.0 | 2,824.8 | 3,610.5 | 3,399.4 | 3,371.3 | 3,361.3 | 3,711.9 | 4,243.2 | 4,576.1 | 4,530.4 | 4,184.8 |
| *% Change* | | *-17.7* | *13.5* | *1.3* | *27.8* | *-5.8* | *-0.8* | *-0.3* | *10.4* | *14.3* | *7.8* | *-1.0* | *-7.6* |
| Dwelling starts (Number) | 1,712 | 2,034 | 1,696 | 1,450 | 1,371 | 1,459 | 1,788 | 2,419 | 2,692 | 2,870 | 2,498 | 2,234 | - |
| *% Change* | | *18.8* | *-16.6* | *-14.5* | *-5.4* | *6.4* | *22.5* | *35.3* | *11.3* | *6.6* | *-13.0* | *-10.6* | |
| Retail trade NAICS ($Millions) | 3,626 | 3,672 | 3,957 | 4,102 | 4,433 | 4,760 | 5,201 | 5,407 | 5,736 | 5,756 | 5,826 | 6,042 | - |
| *% Change* | | *1.3* | *7.8* | *3.7* | *8.1* | *7.4* | *9.3* | *4.0* | *6.1* | *0.3* | *1.2* | *3.7* | |
| New motor vehicle sales (Number) | 17,112 | 16,199 | 20,985 | 21,472 | 24,421 | 23,859 | 24,649 | 25,790 | 25,428 | 22,898 | 24,899 | 24,188 | - |
| *% Change* | | *-5.3* | *29.5* | *2.3* | *13.7* | *-2.3* | *3.3* | *4.6* | *-1.4* | *-9.9* | *8.7* | *-2.9* | |

**Source:** Newfoundland and Labrador Statistics Agency (2007b).
**Note:** p = preliminary.
* = Hibernia began production in November 1997, Terra Nova in January 2002, and White Rose in November 2005. Voisey's Bay began in September 2005.

**Table 2.3 Unemployment Rates for Canada, Newfoundland and Labrador and its Economic Regions, Three-Month Moving Average Ending in March 2006**

| | Unemployment Rate (%) |
|---|---|
| Canada | 6.9 |
| Newfoundland and Labrador | 17.6 |
| Avalon Peninsula | 12.7 |
| South Coast – Burin Peninsula | 25.8 |
| West Coast – Northern Peninsula – Labrador | 19.9 |
| Notre Dame – Central – Bonavista Bay | 25.7 |

**Source:** Statistics Canada (2007).

### 2.2.1 Mining

The mining industry contributes significantly to the provincial economy, directly accounting for 3 per cent of GDP and 1.4 per cent of employment. On average, 1,470 people were employed by Voisey's Bay (construction and mining), including those at the Argentia Demonstration Plant. The value of mineral shipments increased over 130 per cent in 2005, an increase of almost $1 billion over 2004 (Table 2.2). This includes 15,000 t of concentrate shipped by Vale Inco NL. The total value of this industry increased almost another $1 billion in 2006 (64%), as the first full year of production was completed at Voisey's Bay (NLDF 2006a).

### 2.2.2 Oil and Gas

Offshore oil and gas revenues (Corporate Income Taxes and Royalties) for the provincial government amounted to $703.1 million in 2006-07 (NLDF 2006c). In the 2006 budget update, the Minister of Finance reported this forecast amount was down by $202 million because of the six-month shutdown at the Terra Nova field (NLDF 2006b). However, offshore oil and gas are now among the largest and

fastest growing revenue sources, comprising 16 per cent of the GDP in 2005-06. Total direct oil production employment is expected to be 2,500 in 2006, up from 1,700 in 2005 (NLDF 2006a).

### 2.2.3 Newsprint

In 2005, the volume of newsprint shipped out of Newfoundland and Labrador increased by 4.1 per cent to over 761,000 t (Table 2.2). Due to globally increased newsprint prices (from US $550 in 2005 to US $610 in 2006), the value of Newfoundland and Labrador's newsprint shipments increased 7.5 per cent in 2005 to $563 million. However, due to the Closure of the Stephenville pulp-and-paper mill in October 2005, there was a >20 per cent decline in shipments to 594,800 t in 2006 (NLDF 2006a).

### 2.2.4 Fishery and Aquaculture

The fishing industry, both harvesting and processing, contributed 3.5 per cent to the provincial GDP and 7.5 per cent to employment in 2005; however, the value of fish landings in 2005 was down more than 20 per cent from 2004. Revenues from the fishery in 2006 were expected to be on par with 2005 due to a late start of the crab season, a soft market for key species including crab, unfavorable exchange rates, and competition from China and Europe. The aquaculture industry showed solid growth in 2005, with export value for aquaculture products increased from $22 million in 2004 to $33.5 million in 2005 (NLDF, 2006a).

### 2.2.5 Tourism

Tourism spending in Newfoundland and Labrador is approximately $800 million annually, with resident travel accounting for 60 per cent. Preliminary data show that 469,000 non-residents visited in 2005, spending $336 million, an increase of 4.5 per cent in number of visitors and 4.9 per cent in expenditures from 2004. Tourism revenues for 2006 were expected to remain close to 2005 figures. The observed shift in mode of travel, from car to air, partially due to high gasoline prices, is expected to continue (NLDF, 2006a).

### 2.2.6 Construction

Construction investments rose for the third consecutive year in 2005, increasing over 10 per cent from 2004 to nearly $3.2 billion. Construction employment also grew in 2005 for the third consecutive year, up 6 per cent over 2004 to 12,400 people. This followed a 23 per cent increase in construction employment from 2003 to 2004. Investment in this industry was expected to show a decrease in 2006 by over 7 per cent to $2.9 billion, due largely to reductions in non-residential construction, which is forecast to decline by over 10 per cent to $1.9 billion (NLDF 2006a).

## 2.3 Study Area Economy

The economy of the Study Area is relatively diversified. The main sources of employment, by industry, are manufacturing, primary industry, construction, and health care and social assistance. The main

occupations are trade, transport, equipment operation, occupations unique to primary industry, and occupations unique to processing, manufacturing and utilities.

### 2.3.1 Labour Force

The Study Area labour force comprises approximately 4 per cent of that for the province, with 44 per cent of the population being employed or looking for work. The largest numbers of workers are in Placentia, Arnold's Cove, Sub-division 01Y (including Old Shop, South Dildo, and Blaketown) and Whitbourne.

The participation rate (percentage of work-age population working or actively seeking employment) for both men and women has been consistently lower than in the province as a whole. Unemployment rates for men and women in declined between 1991 and 2001.

### 2.3.2 Income Support

The number and proportion of individuals receiving income support and Employment Insurance (EI) benefits has decreased in both the region and the province. The numbers of income support recipients in the region declined by 44 per cent between 1992 and 2005; in 2005, income support cases were at a 14-year low, having peaked at 16,835 in 1995. Total provincial recipients decreased by 40 per cent over the same period.

The number of EI beneficiaries in the region decreased between 1992 and 2003 by 29 per cent, as compared to 35 per cent in the province as a whole. Although the number of EI beneficiaries decreased in the mid-1990s and has since remained fairly stable in both groups, the percentage of population in the region receiving EI has been consistently higher; in 2003, 51.5 per cent of its labour force received EI, as compared to 36.5 per cent in the province.

### 2.3.3 Education

As of 2001, approximately 25 per cent of the workforce had completed a trades certificate/diploma and approximately 12 per cent had completed a college certificate or diploma (Statistics Canada, 2001). More than half of the workforce in the Study Area had not completed a post-secondary qualification, and almost half of those over the age of 35 had not completed high school (Statistics Canada, 2001).

# 3.0 Assessment Methods

The methods of socio-economic effects assessment used here are comparable to those of other environmental assessments in Atlantic Canada and conform to the *Canadian Environmental Assessment Act* (CEAA) (Government of Canada 2003), the Responsible Authority's Guide (CEA Agency 2000), and the provincial *Environmental Protection Act* (EP Act) and Environmental Assessment Regulations (NLDEC 2006a). Guidance was also provided by the federal/provincial Guidelines for the Environmental Impact Statement. Cumulative effects were assessed in accordance with the CEAA (see CEA Agency 1994a, 1999; Barnes *et al*. 2000).

## 3.1 Scope

The scoping of an environmental assessment includes determining the spatial and temporal boundaries of the assessment, deciding which components (i.e., sensitive and/or valued elements) of the socio-economic environment to assess, and which Project activities to analyze. Input was sought from relevant government agencies such as the CEAA, DFO, Environment Canada, Natural Resources Canada, Transport Canada, and municipalities, the public, and Vale Inco NL personnel and consultants.

Both the Project Registration and Draft EIS Guidelines were available for public review and comment. In addition, VBNC conducted public and stakeholder information and consultation sessions for several years, as detailed in Volume 1, Section 10.6. All relevant information on Project activities and all available literature on the effects of nickel-processing activities (with emphasis on previous environmental assessments for Newfoundland and Labrador) were reviewed to assist in issues scoping.

### 3.1.1 Issues and Concerns

Public consultation is an integral part of the environmental assessment process as per Section 58 of the provincial EP Act and Section 16 (1) of the CEAA. The formal public consultation sessions for the Project used notification protocols consistent with the requirements provided in Appendix A of the EIS Guidelines (NLDEC 2006d). Details of the process undertaken for the Project are given in Volume 1 of the EIS.

The consultation process generated a number of questions and concerns about the socio-economic effects of the Project. These are categorized and listed in Appendix C. The issues and concerns fall into three main categories.

- Business opportunities and benefits:
    - Regional development planning,
    - Economic costs and benefits (local and regional);
- Employment benefits:
    - Hiring practices and preferences,
    - Training opportunities;

- Regional quality of life:
  - Effects on local demography;
  - Effects of increased demands on local services and infrastructure;
    - Fire protection,
    - Health and well-being,
    - Accommodations, and
    - Traffic;
  - Effects on those with low/fixed incomes; and
  - Effects on recreation/leisure activities.

Many of these issues were related to specific phases of the Project, i.e., Construction, Operations or Decommissioning.

### 3.1.2 VEC Selection

Environmental effects assessment in Canada is based on the Valued Ecosystem Component (VEC) approach (Beanlands and Duinker 1983). It is neither feasible nor desirable to assess the effects of the Project on every aspect of the economy and society that might apply; rather, the VEC approach focuses on the elements of the ecosystem of most interest and value to society. Selected as a VEC for detailed analysis demanded that at least four criteria had to be satisfied:

- The component is of demonstrated value (economic, scientific, cultural or ecological) to society (or has particular value as a key indicator or surrogate for the component of most interest).
- Concern about the component has been expressed by the public and/or regulators during the environmental assessment process.
- There is potential for the component to be measurably affected by the Project.
- Data are available or can be collected in a reasonable timeframe to produce a credible analysis.

VBNC conducted reviews of information and undertook a scoping exercise to identify potential VECs. In the preparation of Guidelines for the Project, a committee of government officials consulted with regulatory agencies and resource managers, and input was solicited and received from the public. On that basis a set of VECs was identified and incorporated into the EIS Guidelines (NLDEC 2006d). As well, the consultation efforts have confirmed that the selected VECs address the suite of identified issues and concerns.

The four socio-economic VECs as specified in the EIS Guidelines are described below.

**Economy, Employment and Business** encompasses aspects of the socio-economic environment that are important to all citizens. The economy as a whole will benefit from the taxes and royalties that the

Project and its employees pay to different levels of government. This income can be used by governments to address a wide range of social and economic needs.

Some people will benefit directly or indirectly from Project employment, from the skills acquired through training and from the experience. New industrial projects generally benefit the surrounding area through direct and indirect employment, and as employee and business spending generates induced employment and income effects throughout the local economy. However, the effects on some individuals and groups can be negative; for example, wage inflation caused by the Project may adversely affect local businesses, while an increase in the cost of living may adversely affect those on low and fixed incomes.

**Services and Infrastructure** are important: citizens value the components that make up this VEC for their contribution to the quality of life. Employment stemming from the Project may result in higher incomes or lifestyle changes, or encourage in-migration, leading to increased demands on available services and infrastructure; where they are already operating at or beyond their capacity, any increased demand could reduce the overall quality of services until such a time as capacity issues can be addressed. Where services and infrastructure are underused, increased demand may have a positive effect through user-pay and greater efficiency of use.

**Recreational Activities** are important: they contribute to physical and mental well-being. Sports activities primarily serve recreation and leisure needs, while hunting, trapping, fishing, berry-picking, cutting firewood, and similar activities can also contribute to the economic well-being of participants. Parks, trails and historic resources are important for leisure and recreational use by local residents, as well as for tourism; and hence, they benefit the local economy.

**Commercial Fisheries and Aquaculture**. The biophysical VEC for fish and fish habitat included "commercial fisheries and aquaculture." Because it is, at least in part, reflective of human activities, fisheries and aquaculture aspects are addressed in this volume. Both industries provide jobs and economic benefit to harvesters, processors and associated service industries, and the fishery represents an important cultural attachment for Newfoundlanders and Labradorians. As a renewable resource, the fishery can contribute to a sustainable economy, provided fish stocks are managed properly and enterprises maintain profitability. The Project introduces possible limitations to commercial fisheries, including access to fishing grounds and the use of these grounds, deployment of fishing gear, success in harvesting, and marketability of the catch. The Project also has the potential to affect the condition and integrity of aquaculture gear, the ability to seed gear, to tend and harvest stock and to mark the product.

This rest of this section describes the assessment methodology used for the Economy Employment and Business, Services and Infrastructure, and Recreational Activities VECs. The methodology used for the Commercial Fisheries and Aquaculture VEC is as described for the biophysical VECs in Volume 2.

## 3.2 Information Base and Supporting Studies

A wide variety of databases and existing information were used in the socio-economic component of this EIS. These sources are described in the sections that follow. VBNC also commissioned these baseline and supporting studies:

- Historic Resources Overview Assessment (Stage 1) Long Harbour Placentia Bay – GPAL (2006);
- Long Harbour Commercial Nickel Processing Plant 2007 Socio-Economic Component Study – JW (2007a); and
- The Economic Impacts Associated with Voisey's Bay Nickel Company's Commercial Processing Plant at Long Harbour, Newfoundland and Labrador – Wade Locke Economic Consulting (2007).

Other Placentia Bay projects for which environmental assessments have been completed were also examined for relevant information:

- Environmental Impact Statement for the Argentia Offshore Support Base (ADC 1983);
- Placentia Bay Environmental Impact Study Volume 1. Report for Newfoundland and Labrador Department of Development and Tourism (Newfoundland Environmental Consultants Limited et al. 1986);
- Long Harbour Decommissioning Environmental Impact Statement. Part II – Impact Assessment, Volumes I and II of II. Submitted to Department of Environment and Lands (Albright and Wilson Americas 1994a,b);
- Newfoundland Transshipment Terminal Project: Environmental Assessment. Volume 2, Main Report. (Chevron et al. 1996); and
- Newfoundland and Labrador Refinery Corporation, Environmental Impact Statement, Volume 4: Socio-Economic Assessment. (NLRC 2007).

A variety of "plausible worst-case" accidents were modeled by AMEC and SGE-Hatch for events that might have social or economic consequences, for example, fuel and acid spills, dam or berm failures and chlorine release.

## 3.3 Boundaries

Temporal and spatial boundaries have been defined using the federal/provincial EIS Guidelines, (CEAA 2003) and previous assessments in the area as guidance.

### 3.3.1 Temporal

Effects have been assessed for the three Project phases: Construction (2008 to 2011), Operation (2011 to 2026) and Decommissioning (Closure 2026 to 2031; Post-Closure undefined).

The overall temporal boundaries are therefore from 2008 to 2031.

### 3.3.2 Spatial

**Project Site**

The Project Site is considered to be the footprint of the Project's infrastructure and major activities (e.g., Plant Site, disposal area, wharf, pipeline and diffuser) and any exclusion zones that may be set up during construction for safety reasons.

On land, the Project Site boundary is defined by the property boundaries, although the physical footprint is smaller. In the marine environment, the Project Site is defined as the wharf, effluent pipeline corridor and a shipping route from the Long Harbour entrance to wharfside.

**Geographic Extent**

This term originated with CEAA and refers to the geographic area of specific effects on people, a species, species groups, and their habitats. It varies according to the timing and type of Project activity and the subject being assessed. The geographic extent boundaries were determined with the aid of existing literature and on the basis of past experience.

**Study Area**

The Study Area (Figure 3.1) is the area that will experience the greatest interaction between the workforce and the socio-economic VECs. It approximates a 50-km highway distance commute zone around the Project Site, and comprises Statistics Canada census sub-divisions 1A, 1B, 1X, and 1Y.

**Region**

The region comprises Provincial Economic Zones 15, 17 and 18 (see Figure 3.2). It is used in assessing some broader-scale socio-economic effects, such as those on elements of health care and physical infrastructure, for which Study Area data are not available.

**Province**

Some socio-economic variables can be considered only at the provincial level; for example, the economic effects on GDP, taxes and royalties are provincial matters. Likewise, given the short-term nature of the work, much of the province's construction workforce is highly mobile and many workers will commute to the worksite. Given the numbers of workers required, particularly during Construction, it is necessary to consider the provincial workforce as well as that of the Study Area and the Region.

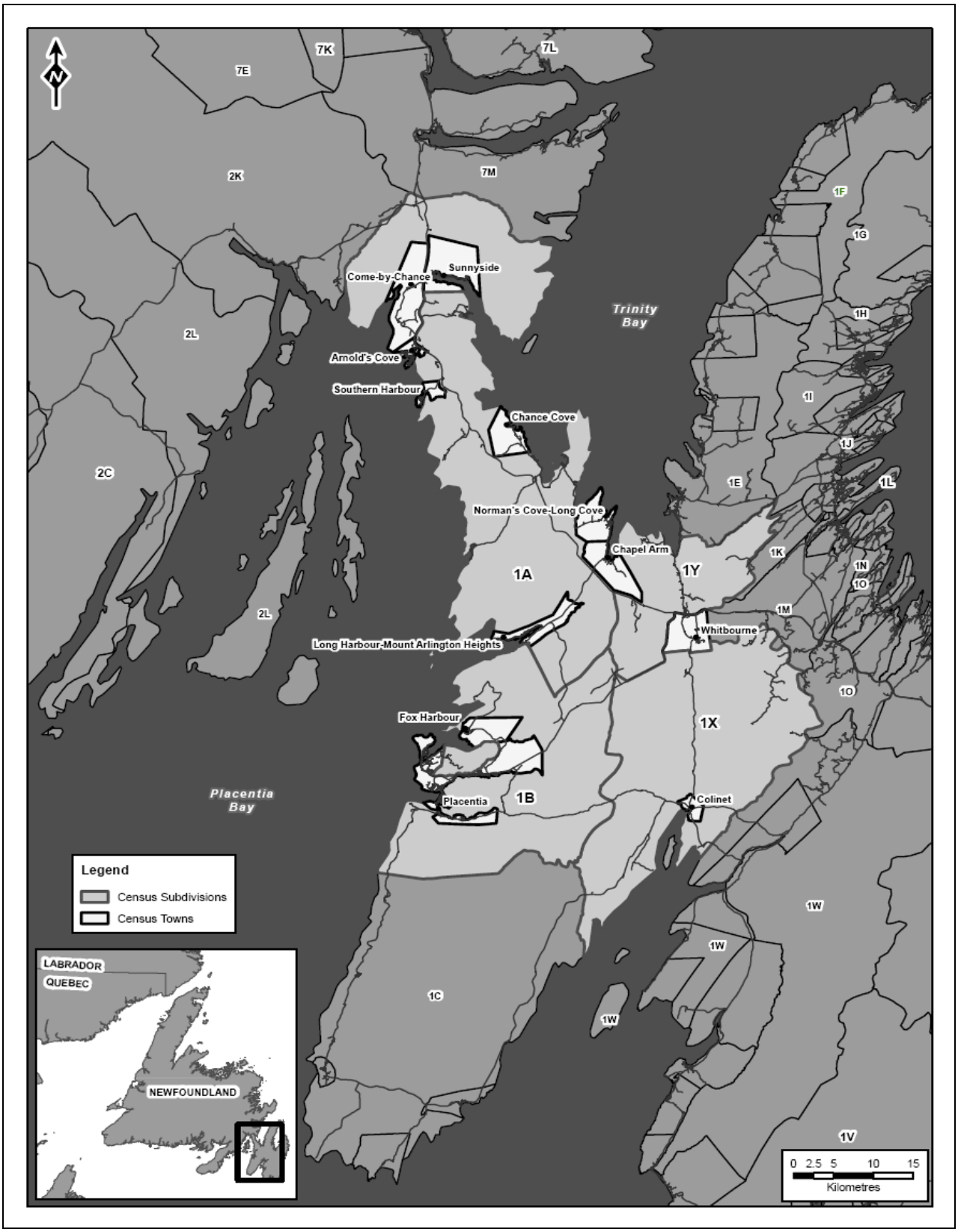


**Figure 3.1 Study Area**

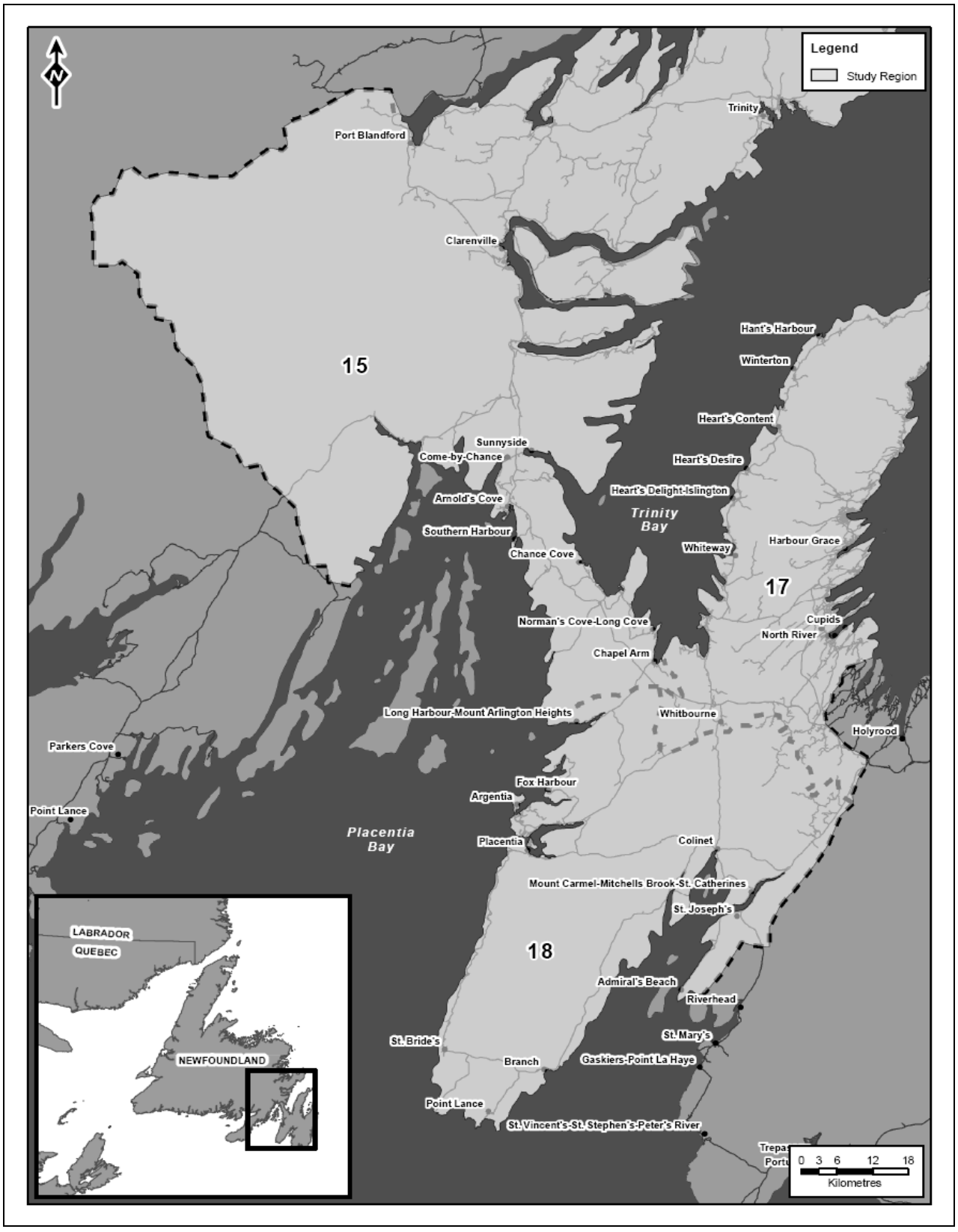


**Figure 3.2 Region**

### Other Boundaries

Other boundaries, including administrative ones such as municipal limits, are used when considering local effects such as those on land use. The St. John's CMA is also used, by virtue of its importance as the provincial capital and the location of regional infrastructure relevant to the Project, in particular the Port of St. John's and St. John's International Airport.

## 3.4 Socio-Economic Effects Assessment

Economic impact assessment examines the effects of a project on local, regional and national economies. The high-order economic effects of the Project on Newfoundland and Labrador have been predicted using a model that has been applied to most of the large resource development projects proposed in the province over the past decade (Wade Locke Economic Consulting, 2007). The model tracks expenditures through the economy and applies coefficients to determine direct, indirect and induced effects on employment, incomes, GDP and taxation, based on cash-flow forecasts prepared by Vale Inco NL for each of the processing plant options. Where uncertainty exists, a range of estimates is given to indicate the sensitivity of Project effects to external factors that are beyond the control of Vale Inco NL.

Social impact assessment considers measurable change in human populations, communities and social relationships resulting from a project. It assesses the social and cultural effects of a project and, in particular, how it could alter the day-to-day way in which individuals within the geographic areas live, work and play, relate to each other, organize to meet individual needs and generally cope as members of society. Such an assessment provides an appraisal of potential social effects, and the consideration of possible corrective and enhancement measures that would help to reduce or avoid negative outcomes and maximize positive outcomes.

The assessment of the potential effects of the Project involved four major steps:

- Identification of all potential interactions between Project activities and each VEC;
- Evaluation of each interaction, including consideration of cumulative effects and optimization measures, to generate predictions of likely residual effects;
- Description and evaluation of any residual effects; and
- Recommendations for any follow-up activities.

Interaction matrices were prepared to identify Project activities that could interact with each VEC. The matrices list these activities by Project phase and identify potential interactions by type for each VEC component; however, they make no assumptions about the potential consequences of the interactions. At the next stage of assessment, each identified interaction was evaluated for its potential to cause effects. Where the potential was deemed unlikely or incidental, they were not considered further. The assessment focused on key issues and substantive socio-economic effects.

An interaction was considered to be a potential effect if it could change the quantity or quality of the VEC or VEC component. The component was rated through a variety of approaches:

- Anticipated location, magnitude and timing of the interaction;
- Interaction pathways between the Project activity and those individuals or groups likely to be affected;
- Literature on similar interactions and associated effects (including previous environmental assessments); and
- Consultation with other professionals.

When data were insufficient to allow certain or precise effects evaluations, predictions were made based on professional judgment. In such cases, the uncertainty is documented.

Socio-economic effects may be positive or negative – or both, where they affect different groups in different ways at a particular time, or affect the same group in different ways at different times. The CEA guidelines (CEAA 1994b) focus primarily on adverse or negative effects. In the context of the socio-economic environment, it is appropriate to consider positive and negative effects, and so the term "optimization" is used here to describe actions that might be taken to avoid or mitigate negative effects, or create or enhance positive ones.

The potential effects of major industrial developments in Newfoundland and Labrador are reasonably well known. In most cases, given previous experience with similar projects both here and elsewhere, many of the potential effects of the Project can be anticipated and addressed as part of the Project design, or adopted as corporate polices or standard operating procedures during the various phases. In this way many potential adverse effects can be avoided at the outset, or mitigated, while potential positive effects can be recognized and actions taken to enhance them. A number of these optimization strategies have been incorporated into the Project design or corporate policy as a consequence of the Demonstration Plant experience. This undertaking provided a unique opportunity to test the applicability of optimization measures. The designed-in approach to optimization means that most of these measures are described in The Project, Volume 1.

Positive and negative residual effects are those expected to remain or expected to result after optimization strategies are implemented. In some cases the design and implementation of such strategies is beyond the mandate of Vale Inco NL and will be the responsibility of Government; this is noted as appropriate. The predicted residual effects of the Project are based on the assumption that appropriate optimization measures are applied and effective.

### 3.4.1 Evaluation Criteria

Residual socio-economic effects were evaluated using the definitions given in Table 3.1 and the criteria and rating system summarized in Table 3.2.

## Table 3.1 Definitions of Attributes Used in the Effects Assessment Process

| Attribute | Definition |
|---|---|
| **Direction** | The ultimate long-term trend of the effect; positive, negative or neutral |
| **Magnitude** | The severity or intensity of the effect; typical measurements of magnitude indicate (quantitative) gains or losses in features or (qualitative) changes in conditions |
| **Geographic Extent** | The area over which the particular effect is expected to occur |
| **Duration** | The time period over which the effect is expected to occur |
| **Level of Confidence** | The anticipated accuracy of the prediction based on an understanding of the limitations of the prediction exercise |
| **Certainty** | The level of probability that the effects predicted will occur |
| **Significance** | An overall measure of the effect on the receptor |

## Table 3.2 Effects Ratings Used for Assessing Socio-Economic Effects

| | |
|---|---|
| **Direction** | |
| Neutral | No discernible positive or negative effect |
| Adverse | Effect is worsening or is undesirable |
| Positive | Effect is improving or is desirable |
| **Magnitude** | |
| Negligible | Outcomes that can be accommodated within the capacity of the existing system or outcomes that do not add substantially to the capacity or quality of the system |
| Medium | Outcomes that exceed the capacity of the existing system, but which can be accommodated through reorganizations in the use of existing resources, or outcomes which result in some increases or improvements to system capacity |
| High | Outcomes that greatly exceed the capacity of the existing system and would require additional system capacity to remain functional, or which greatly improve the capacity or quality of the system |
| **Geographic Extent** | |
| Local | The Study Area |
| Regional | The Region |
| Provincial | Newfoundland and Labrador |
| **Duration** | |
| Short-term | Effects occurring over short periods (up to months) (implicit is the idea that adjustments can be made over this timeframe to accommodate the effects in question) |
| Medium-term | Effects occurring over months or years (implicit is the idea that actions to address the effects in question will take some considerable time to implement) |
| Long-term | Events occurring throughout the Project life (implicit is the idea that the effects will continue throughout the Project, either because these are positive and therefore desirable, or because they are negative effects for which there are no avoidance or further mitigation strategies possible) |
| **Level of Confidence** | |
| Low | Limitations, such as deficiencies in primary and secondary data, or uncertainties associated with external factors, which reduce the ability to make confident predictions |
| Medium | Moderate limitations in primary and secondary data which affect the ability to make confident predictions |
| High | Few limitations in primary and secondary data allow high confidence in predictions |
| **Certainty of Occurrence** | |
| Low | The effect is considered to have a low probability of occurring based on analysis of previous experience in the area, from review of other relevant literature, consultation with experts and professional judgment |
| Medium | The effect has a moderate probability of occurring |
| High | The effect has a high probability of occurring |
| **Significance** | |
| Significant | Having a high magnitude for the medium or long-term at any geographic scale |
| Not significant | Anything other than significant |
| Significant Positive | Effects that result in the increase in magnitude of any beneficial effect at any geographic scale |
| Significant Negative | Effects that have a high magnitude negative effect over the medium-term or longer, at any geographic scale |

### 3.4.2 Cumulative Effects

The assessment of cumulative socio-economic effects is treated in an integrated approach as part of the overall assessment (Barnes *et al*., 2000). Since some socio-economic VECs operate over a province-wide scale (see below), the assessment incorporates the set of assumptions presented in Scenario 2 from the recent Skills Task Force report (Skills Task Force, 2007), including the Hebron offshore petroleum project and the Lower Churchill hydroelectric generation project. The cumulative effects of these activities on each VEC were included as part of the assessment. This was followed by an assessment of the overall effect using the criteria and rating system described above.

Brief descriptions of the other existing and proposed projects or activities that were analyzed for the cumulative effects predictions for the biophysical and socio-economic environments are provided below.

**Vale Inco NL Activities**

Vale Inco NL is operating a hydrometallurgical nickel processing Demonstration Plant in Argentia, capable of processing up to 10 tonnes per day of concentrate containing nickel, cobalt and copper. This plant started operation in October 2005 to undertake a research and development program on hydrometallurgical technology. It will continue operating until June 2008, employing approximately 150 people.

**Oil Transshipment Facility**

The Newfoundland Transshipment Terminal is located at Whiffen Head, on the northeastern shore of Placentia Bay. It was constructed to accept production from the Hibernia and other oil fields on the Grand Banks. Crude oil is transported year-round to the facility by three 127,000 DWT (cargo capacity of about 850,000 bbl) shuttle tankers, and then to Canadian and eastern U.S. markets by second-leg tankers. The facility receives approximately 300 tankers per year. A U.S.-based terminal operator, International Matex Tank Terminals (IMTT), was contracted by Newfoundland Transshipment Limited (NTL) to manage and operate the terminal. The Newfoundland Transshipment Terminal employs 21 people, with another 20 Canship Ugland employees working on two purpose-built escort and firefighting tugs. The facility has a storage capacity of three billion barrels of crude oil.

**Come By Chance Oil Refinery**

The North Atlantic Refinery is located near Come By Chance, at the head of Placentia Bay. It operates under the management of North Atlantic Refining Limited and has a total capacity of 115,000 barrels per day. It produces low-sulphur fuels from Middle Eastern, Russian and Venezuelan sour crude. It has a workforce of over 700.

### Burin Peninsula Ship Yards

The KOS Shipyard (Marystown Shipyard) and the Cow Head Steel Fabrication Facility are located near Marystown on the Burin Peninsula, on the west side of Placentia Bay. The shipyard has been an important shipbuilding and fabrication facility for ocean industries. The Cow Head yard is a self-contained steel fabrication plant that includes fabrication facilities for plate, profiles, pipe and titanium, as well as a blast shop and a paint shop. Both facilities are owned by Peter Kiewit and Sons, members of one of the two consortia bidding on a $2.1-billion joint support ships contract that will be awarded in June or July 2008. The first ship must be delivered by 2012, and if the bid is successful, construction of these ships would begin in late 2009 or early 2010. The project is estimated to require 550 to 600 skilled trade workers.

### Commercial Fishing and Aquaculture

Placentia Bay hosts a diverse fishery that uses a variety of gear types. In addition, there are a number of blue mussel farms and some potential future ones. Commercial fisheries and aquaculture in Placentia Bay are described in detail in Section 7.1.

### Argentia Marine Terminal

The Marine Atlantic Terminal is one of three wharves administered by the Argentia Port Corporation, a wholly owned subsidiary of the Argentia Management Authority Incorporated. Marine Atlantic, a federal Crown corporation, provides seasonal passenger and vehicle ferry service between Argentia and Nova Scotia; the ferry wharf can be used by other vessels during the off-season with permission from Marine Atlantic (AACC 2003). There were 80 ferry crossings in 2006 (NLDTCR 2007).

### Hunting and Trapping

Hunting and trapping activities are described in Section 6.1.1. Inland hunting in the Placentia Bay area targets moose, caribou, black bear, rabbit, waterfowl, ptarmigan and grouse. Marine-based hunting targets murres (known locally as turres) and a few harp seals. Large number of turres are taken in late winter and early spring, but exact numbers are unknown (P. Ryan, pers. comm.).

### Proposed Southern Head Oil Refinery

The Newfoundland and Labrador Refinery Corporation proposes to construct an oil refinery at Southern Head, between North Harbour and Come by Chance, at the head of Placentia Bay. An environmental assessment of the proposed project is under way and an Environmental Impact Statement was recently submitted to government. The refinery would have an initial production capacity of 300,000 barrels per day with the option to expand to 600,000. The primary products of the refinery would be gasoline, kerosene/jet fuel, ultra-low-sulphur diesel, and refining by-products.

The infrastructure required would include process facilities, a marine terminal, crude and product storage tanks, an access road and utilities. Annual shipping is estimated at 400 to 425 tankers and bulk carriers, depending on the vessel size. Construction would take approximately three years to complete, with a peak construction workforce of 3,000 people. Production is planned to begin in late 2010 or early 2011, and will involve 750 employees.

**Proposed Liquefied Natural Gas Transshipment Terminal**

Newfoundland LNG Limited proposes to construct a Liquefied Natural Gas (LNG) Transshipment and Storage Terminal near the head of Placentia Bay at Grassy Point, Arnold's Cove. The terminal would provide storage and offloading for large LNG vessels and transfer to smaller ones for distribution to northeastern U.S. and Canada. The project involves the construction of a wharf comprising three jetties with berthing capacity for LNG tankers up to 265,000 $m^3$ capacity, eight LNG storage tanks with a capacity of 160,000 $m^3$ each, a tug-boat basin and supporting infrastructure. Annual shipping is estimated at up to 400 tankers, depending on vessel size. Construction would employ at peak 350 to 450. The facility is scheduled to be on-stream in January 2010 with 10 operations staff.

**Marine Transportation**

Most of the projects and activities described involve some type of marine transportation. The best available data on marine vessel traffic in Placentia Bay, collected by Vessel Traffic Services, are provided in the Socio-Economic Component Study (JWL, 2007a).

### 3.4.3 Residual Environmental Effects

Once the potential effects have been identified and characterized, and any optimization measures considered, residual effects are identified and evaluated for significance with respect to each Project activity or accident scenario.

The analysis and prediction of the significance of socio-economic effects, including cumulative effects includes determination of the significance of residual environmental effects, establishment of the level of confidence for the prediction, and evaluation of the likelihood that a predicted significant residual effect will occur.

Ratings (see Section 3.4.1) for level of significance, confidence and likelihood of occurrence are presented in summary tables.

### 3.4.4 Likelihood of Occurrence of Significant Effects

The criteria for the evaluation of the likelihood of significant effects are probability of occurrence and scientific certainty.

## 3.5 Accidental Events Assessment

Accidental events can lead to direct effects on the socio-economic environment or indirect effects as a result of damage to the biophysical environment. Particular concerns are associated with the effects on human health and safety, economic and recreational activities (e.g., the commercial fishery, tourism and recreational natural resource use). The severity of effects from accidental events depends on among other factors, the magnitude of the event, its location and, in some cases, the time of year it occurs.

Accidental events can be generally categorized as spills or unplanned releases to the environment of such materials as fuel and hazardous materials, concentrate, wastewater or gases. Potential major accident scenarios have been modeled to help estimate the extent of possible effects. The results of the modeling simulations are approximations and indicate the order of magnitude of the potential events that could discharge to water (fresh and sea), land or air.

The accidental event scenarios have been examined and selected to indicate "plausible worst-case scenarios" for catastrophic events. In practice, extreme measures will be taken to prevent such occurrences and to have a high level of emergency preparedness in place in the event that they should occur. Three scenarios have been identified for consideration:

- Accidental release of hazardous materials into the marine environment (Long Harbour);
- Accidental release of hazardous materials from the plant to the surrounding terrestrial environment; and
- Accidental release of chlorine gas from the plant to the airshed surrounding it.

The effect on each VEC is described, followed by an assessment of the effect using the criteria and rating system described.

## 3.6 Follow-up

In the socio-economic context, follow-up is designed to confirm effects predictions and to establish the effectiveness of optimization measures. It involves monitoring the socio-economic effects of the Project, evaluating data against established criteria, and recommending actions to address concerns that may arise.

The process of effects prediction provides a basis for the development of appropriate and focused monitoring programs that could be developed and implemented in each of the Project phases. In many cases the data collected in support of this assessment will provide a baseline for subsequent evaluation of Project socio-economic effects.

Recommendations for follow-up are given and where the issues to be tracked are beyond the mandate of Vale Inco NL, this is indicated.

# 4.0 Economy, Employment and Business

## 4.1 Existing Conditions

This section describes the existing economic, employment and business environment, and provides a context for the assessment of Project effects. Further information, including more detailed data-sets, is available in the Socio-Economic Component Study (JWL 2007a).

### 4.1.1 Labour Force

The labour force (individuals who have, or are available for, employment) in the Study Area increased from 5,570 in 1991 to 6,405 in 1996, but then declined to 5,740 in 2001. The 2001 Census indicates that the labour force in the Study Area accounted for 44 per cent of the population and approximately 4 per cent of the provincial labour force of 241,495. As demonstrated in Figure 4.1, Placentia has the largest concentration of workers (1,895). Other areas with high concentrations of workers include Arnold's Cove (550), Sub-division 01Y (Old Shop, South Dildo, Blaketown) (460), and Whitbourne (390).

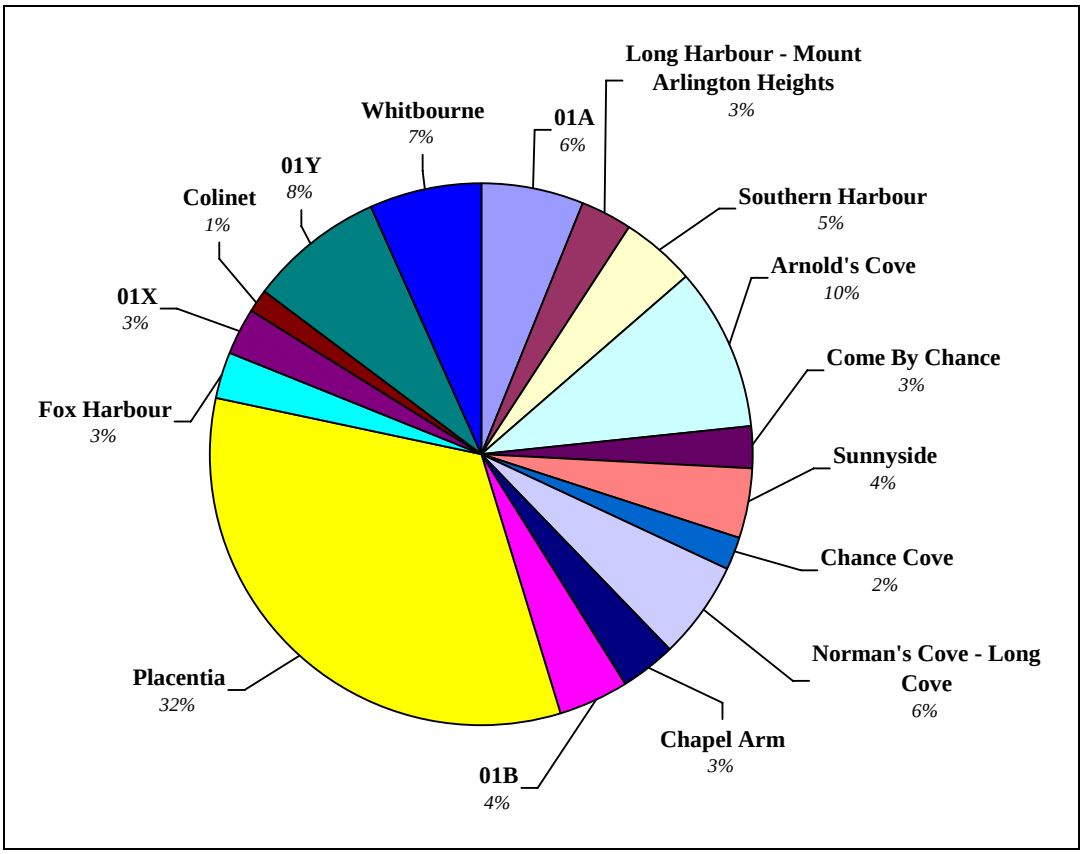


**Figure 4.1 Study Area Labour Force by Census Subdivision, 2001**

The participation rate (the percentage of the work-age population working or actively looking for employment) for men in the Study Area decreased from 65.8 per cent to 60.1 per cent between 1991 and 2001 (Figure 4.2). During the same period, the participation rate for women fell from 51.1 per cent to 47.7 per cent. The 2001 rates for men and women were consistently lower than the provincial rates, which were 63.2 per cent and 52.3 per cent respectively.

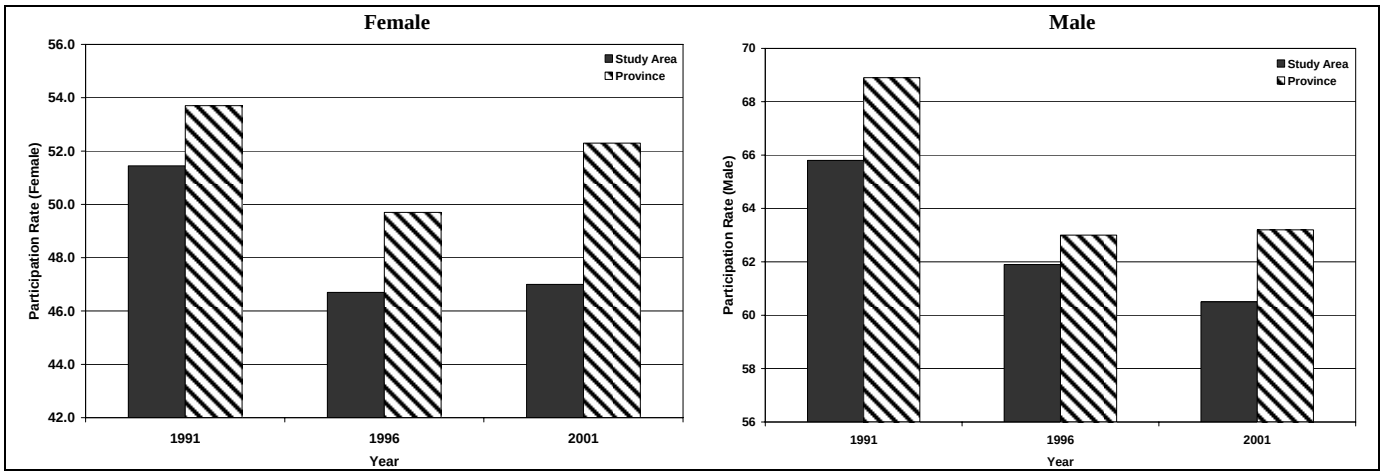


**Figure 4.2 Participation Rates, by Gender, Study Area and Province, 1991-2001**

**Source:** Statistics Canada (1991; 1996; 2001).

Between 1991 and 2001, the unemployment rate decreased, for men from 32.1 per cent to 28.5 per cent and for women from 31.1 per cent to 24.4 per cent. In 2001, unemployment rates for both were considerably higher than those for the province, which were 24.2 per cent and 19.1 per cent respectively (Figure 4.3). Unemployment rates within the Study Area range from 64.7 per cent for men in Fox Harbour to full employment for women in Come By Chance and men in Arnold's Cove.

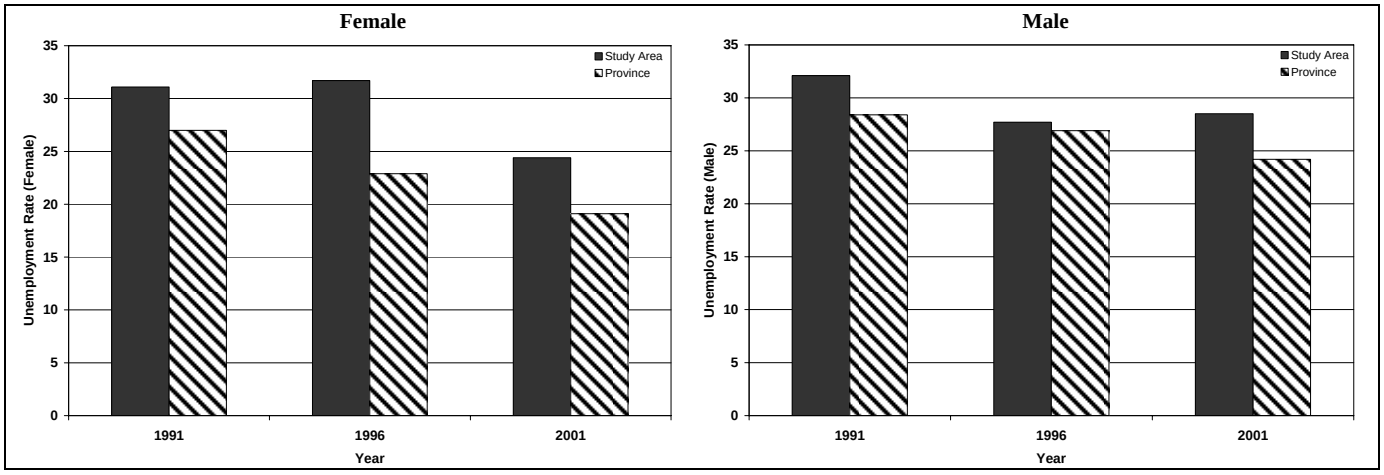


**Figure 4.3 Unemployment Rates, by Gender, Study Area and Province, 1991-2001**

**Source:** Statistics Canada (1991; 1996; 2001).

The 2006 employment and unemployment rates can be derived from labour force estimates for the St. John's CMA and the Avalon Peninsula Economic Region (Table 4.1). Between 2001 and 2006, the employment rate in the non-CMA part of the Avalon grew by 1.4 percentage points, an increase of approximately 1,500 individuals. The unemployment rate has continued to decrease since 2001, down to 21.2 from 22.9 per cent in the non-CMA Avalon area.

**Table 4.1 Labour Force Characteristics, St. John's CMA and Avalon Peninsula Economic Region, 2001 and 2006**

| Area | Labour Force (000s) | | Employed (000s) | | Unemployed (000s) | | Unemployment Rate (%) | | Employment Rate (%) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2001 | 2006 (est) | 2001 | 2006 (est) | 2001 | 2006 (est) | 2001 | 2006 (est) | 2001 | 2006 (est) |
| **Avalon Peninsula Economic Area** | 123.4 | 132.2 | 108.1 | 117.5 | 15.4 | 14.7 | 12.5 | 11.1 | 87.6 | 88.9 |
| **St. John's CMA** | 94.2 | 101.6 | 85.5 | 93.4 | 8.7 | 8.2 | 9.2 | 8.1 | 90.8 | 91.9 |
| ***Rural Avalon*** | *29.2* | *30.6* | *22.6* | *24.1* | *6.7* | *6.5* | *22.9* | *21.2* | *77.4* | *78.8* |

**Source:** NLDF (2007).

The provincial employment rate has grown 4 per cent since early 2006, an increase of approximately 9,000 individuals on an average monthly basis. During the same period, full-time employment increased by six per cent. Healthcare, income support, educational services and natural resources were strong contributors to this growth (Statistics Canada, 2006b). Study Area data for 2006 were not yet available at the time of the assessment.

In 2001, the average personal income in the Study Area was $21,553, just below the provincial average of $22,662 (Statistics Canada, 2001). This is an increase of nearly $10,000 for both men and women since the mid-1980s (Table 4.2). The average personal incomes in the Study Area have been consistently on par with those for the province.

**Table 4.2 Average Personal Income, by Gender, Study Area and Province, 1986 and 2001**

| Census Area | Male ($) | | Female ($) | |
|---|---|---|---|---|
| | 1986 | 2001 | 1986 | 2001 |
| 01A | 12,588 | 31,641 | 7,659 | 12,808 |
| Long Harbour - Mount Arlington Heights | 19,299 | 35,935 | 7,883 | 16,374 |
| Southern Harbour | 14,129 | 31,421 | 7,843 | 16,102 |
| Arnold's Cove | 16,031 | 30,331 | 7,950 | 16,379 |
| Come By Chance | 15,835 | 42,183 | 9,551 | 14,379 |
| Sunnyside | 17,363 | 27,327 | 8,745 | 13,604 |
| Chance Cove | 14,137 | 22,227 | 9,418 | 11,306 |
| Norman's Cove - Long Cove | 17,452 | 28,250 | 7,707 | 12,900 |
| Chapel Arm | 19,071 | 25,870 | 6,878 | 14,688 |
| 01B | 13,836 | 38,192 | 9,036 | 15,454 |
| Placentia | 14,965 | 25,459 | 9,508 | 13,873 |
| Dunville | 19,279 | - | 10,166 | - |
| Freshwater | 13,620 | - | 8,208 | - |
| Jerseyside | 13,507 | - | 10,127 | - |
| Fox Harbour | 15,095 | 20,429 | 6,782 | 13,597 |
| 01X | 13,217 | 19,835 | 4,618 | 19,259 |
| Colinet | 14,607 | - | 11,391 | - |
| 01Y | 17,199 | 24,844 | 6,599 | 13,498 |
| Whitbourne | 15,308 | 23,923 | 7,098 | 14,527 |
| **Study Area** | **15,775** | **28,524** | **8,306** | **14,583** |
| ***Province*** | ***17,582*** | ***28,144*** | ***9,876*** | ***17,181*** |

**Source:** Statistics Canada (1986; 2001).

### 4.1.2 Income Support and Employment Insurance

Between 1992 and 2005, the number of individuals receiving income support in addition to EI benefits has decreased regionally and provincially (Table 4.3).

**Table 4.3 Use of Income Support Assistance and Employment Insurance, 1992 and 2005, Region and Province**

| | 1992 | | 2005 | | % Change | |
|---|---|---|---|---|---|---|
| | Region | *Province* | Region | *Province* | Region | *Province* |
| **Income Support Assistance (Individuals)** | 16,825 | *101,105* | 10,265 | *65,875* | - 39.0% | *- 34.8%* |
| **EI beneficiaries (Individuals)** | 29,130 | *154,235* | 20,760 | *101,020* | - 28.7% | *- 34.5%* |

**Source:** Newfoundland and Labrador Statistics Agency/Community Accounts (2007).

Both the number of income support recipients and the percentage of the population receiving income support have decreased in the region. Income support recipients declined by 39 per cent between 1992 and 2005, when it was at a 13-year low. During the same period, the number of cases in the province decreased by 34.8 per cent, from 101,105 to 65,875 (Table 4.3). The percentage of the regional population using income support declined from 18.3 per cent in 1992 to 12.3 per cent in 2004; provincially, the percentage declined from 17.6 per cent to 12.3 per cent during the same period (Table 4.3).

The number of EI beneficiaries in the region decreased by 31.4 per cent between 1992 and 2006. Over the same period, the provincial numbers decreased by 36.4 per cent (Table 4.3). Although EI beneficiaries decreased in the mid-1990s and have since remained fairly stable for both groups, the percentage of the regional population receiving EI has been consistently higher than that for the Province (Figure 4.4); in 2004 the numbers stood at 51.5 per cent versus 36.6 per cent respectively.

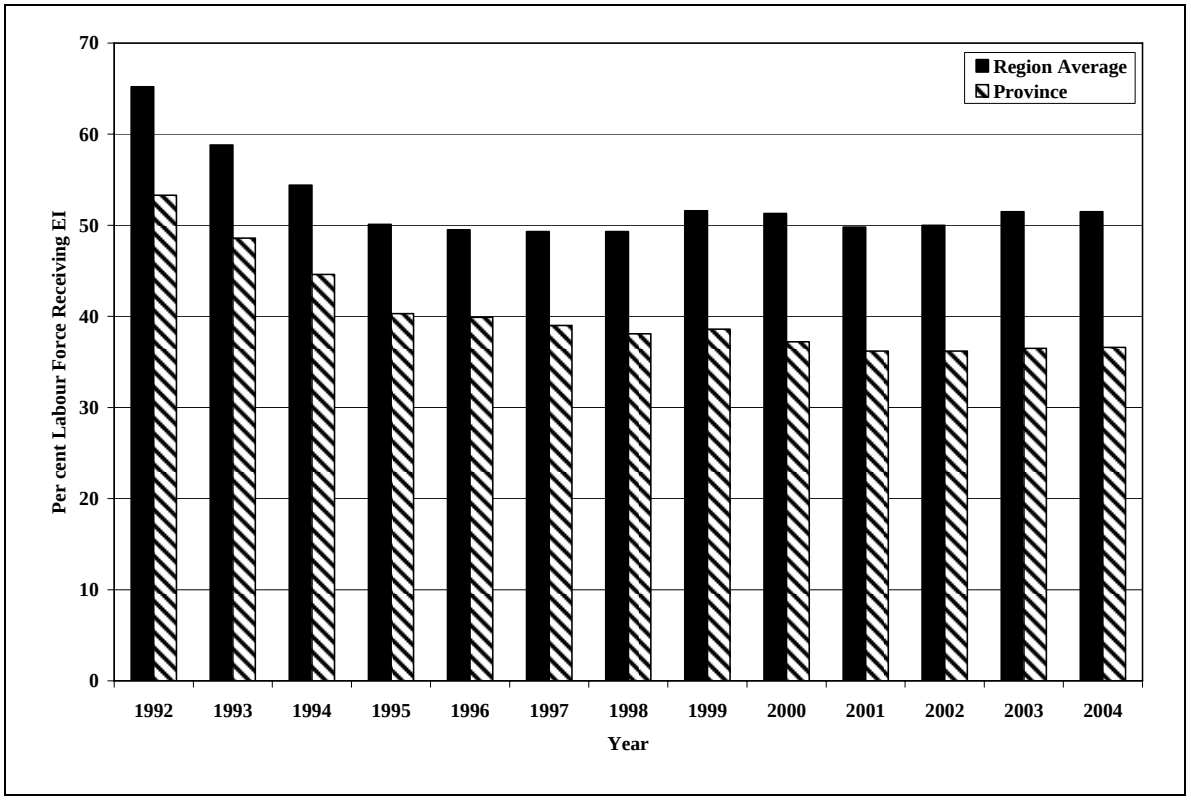


**Figure 4.4 Percentage of Labour Force Receiving Employment Insurance Benefits, Region and Province, 1992 to 2004**

**Source:** Newfoundland and Labrador Statistics Agency/Community Accounts (2007).

### 4.1.3 Education and Training

The highest level of education achieved by the labour force, ages 20 to 64, in the Study Area and the province in 2001 are summarized in Figure 4.5. Approximately 25 per cent of the workers have completed a trades certificate/diploma and approximately 12 per cent have completed a college certificate/diploma (Statistics Canada, 2001). More than half of the labour force in the Study Area has not completed a post-secondary qualification, and almost half of those over the age of 35 have not completed high school (Statistics Canada, 2001).

### 4.1.4 Economy and Business

The economy of the Study Area is relatively diversified. The main sources of employment, by industry, are manufacturing (1,190, 12%), primary industry (730), retail (540, 9.7%), construction (505, 9.0%) and health care and social assistance (475, 8.5%). There are a few people employed in informational and cultural industries (35, 0.6%), arts, entertainment and recreation (20, 0.3%), or finance and insurance (35, 0.6%). A comparison of the percentage of the labour force by industry between the Study Area and the province is provided in Table 4.4.

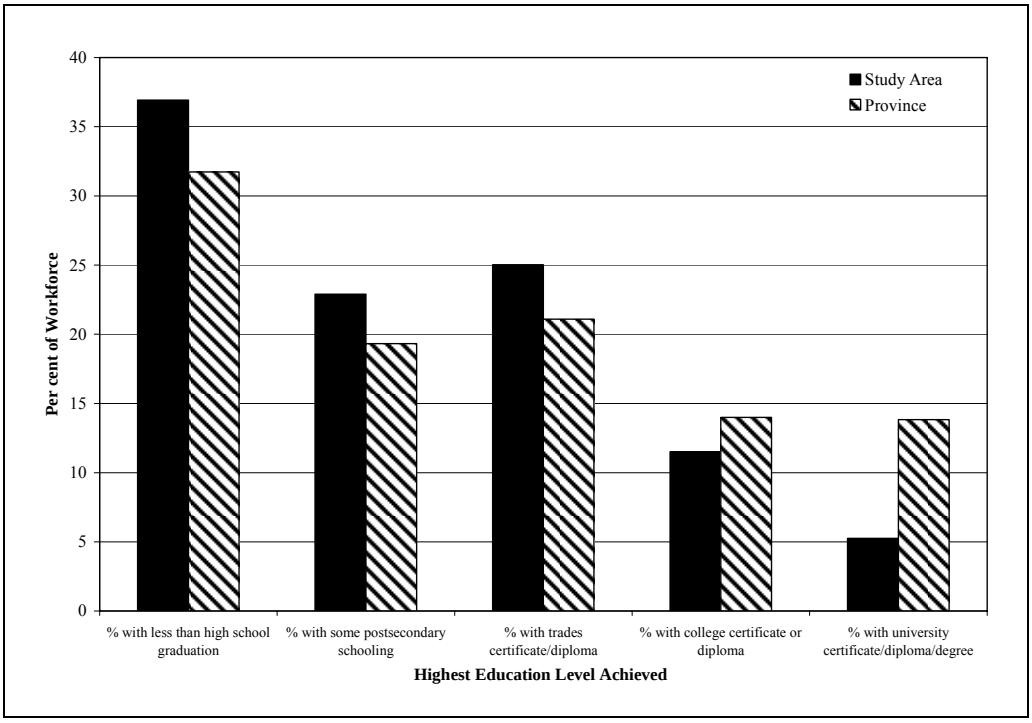


**Figure 4.5 Highest Education Achieved by Workforce, Study Area and Province, 2001**

**Source:** Statistics Canada (2001).

**Table 4.4 Per Cent of Labour Force by Industry, Study Area and Province, 2001**

| | Study Area (%) | Newfoundland and Labrador (%) |
|---|---|---|
| Agriculture, forestry, fishing and hunting | 13.0 | 6.7 |
| Mining and oil and gas extraction | 1.0 | 2.1 |
| Utilities | 0.9 | 0.9 |
| Construction | 9.0 | 6.5 |
| Manufacturing | 21.0 | 10.0 |
| Wholesale trade | 1.5 | 3.1 |
| Retail trade | 9.7 | 12.0 |
| Transportation and warehousing | 6.3 | 5.0 |
| Information and cultural industries | 0.6 | 2.0 |
| Finance and insurance | 0.6 | 2.0 |
| Real estate, rental and leasing | 0.7 | 1.0 |
| Professional, scientific and technical | 1.3 | 3.3 |
| Management of companies and enterprises | 0.0 | 0.1 |
| Administrative and support, waste management and remediation | 3.2 | 2.9 |
| Educational services | 5.4 | 7.2 |
| Health care and social assistance | 8.5 | 12.0 |
| Arts, entertainment and recreation | 0.3 | 1.4 |
| Accommodation and food services | 4.7 | 6.2 |
| Other services | 6.6 | 5.6 |
| Public administration | 5.1 | 8.8 |

**Source:** Statistics Canada (2001).

The main occupations of Study Area residents are sales and service (1,280), trade, transport, and equipment operation (1,270), occupations unique to primary industry (775) and occupations unique to processing, manufacturing and utilities (Figure 4.6).

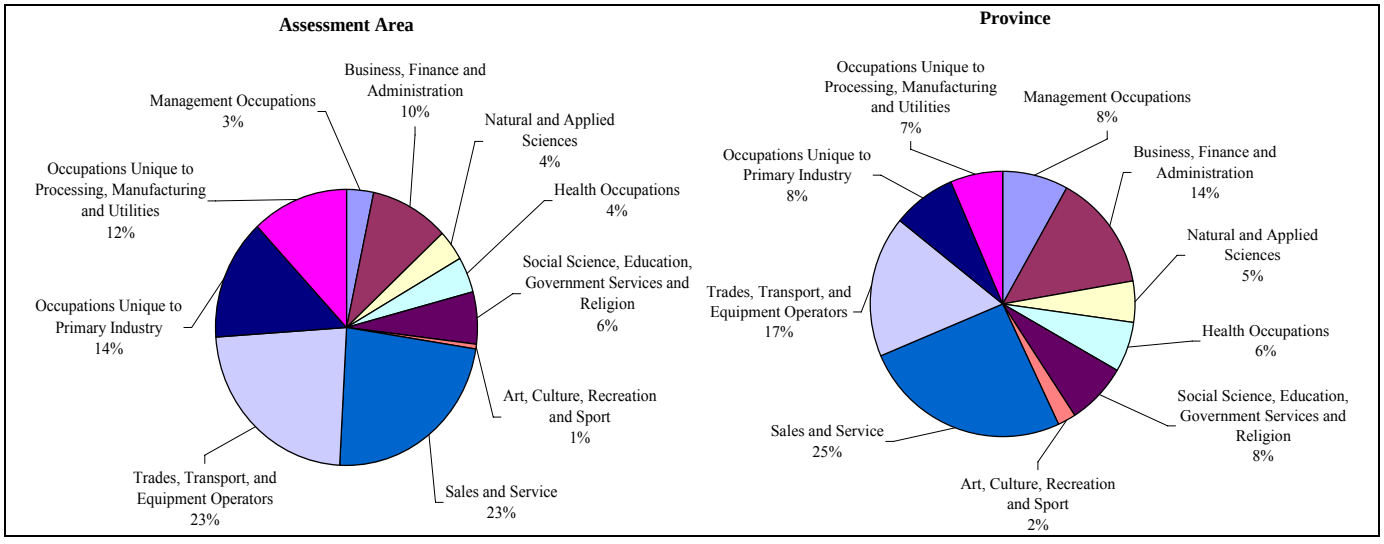


**Figure 4.6 Occupations in the Study Area and Province, 2001**

**Source:** Statistics Canada (2001).

### 4.1.5 Main Businesses

The main businesses and employers in Long Harbour-Mount Arlington Heights, Whitbourne and Placentia, as reported by municipal officials, are summarized in Table 4.5.

**Table 4.5 Main Businesses and Employers in Long Harbour-Mount Arlington Heights, Whitbourne and Placentia**

| **Long Harbour-Mount Arlington Heights** (M. Pretty, pers. comm.) | **Whitbourne** (J. Gosse, pers. comm.) | **Placentia** (E. O'Keefe, R. Power and F. Smith, pers. comm.) |
|---|---|---|
| • Town Council Office<br>• Long Harbour Development Corporation<br>• Labco Foundry<br>• Newco Metals<br>• Canada Post<br>• Maher's Industrial<br>• St. Francis Xavier Parish<br>• Additional businesses operating in the town include Magtek, Murphy's Cash and Carry, JFT Enterprises, Burke's Convenience, Hair Magic, L-Mariedo and Gambin's Services | • Eastern Health<br>• Newfoundland and Labrador Youth Centre<br>• Dr. Newhook Community Health Care Centre<br>• Foodland<br>• Trinity Placentia Stadium<br>• Whitbourne Elementary School<br>• Whitbourne Dental Clinic<br>• Whitbourne Drug Mart<br>• Department of Forestry and Wildlife<br>• Moorlands Motel-Gas Bar and Restaurant<br>• Monty's Place-Gas Bar and Restaurant<br>• Irving<br>• Scotiabank<br>• Payless Foods<br>• Cohens Home Furniture<br>• Smith's Furniture<br>• Stedman's V&S<br>• Baine Johnston Insurance<br>• Temple Accounting and Anthony Insurance<br>• Job's Insurance<br>• Investor's Group<br>• RCMP<br>• Town Council Office<br>• Aliant<br>• Newfoundland Power<br>• Rodrigues Winery<br>• Greenhouses and plant nurseries | • *Total Number of Businesses – 166*<br>• Sales and services - 54<br>• Restaurants and bars - 11<br>• Tourism and recreation (including accommodations) - 13<br>• Healthcare and health services - 8<br>• Automotive and transportation - 15<br>• Education and childcare - 5<br>• Construction and contracting - 21<br>• Banks and financial services - 6<br>• Government departments and management boards - 3<br>• Other - 30 |

## 4.2 Potential Interactions

Almost all of the potential interactions between the Project and employment, training, economy and business are positive. They will occur mostly through the direct effects of employment and expenditures, indirect and induced effects of employment and expenditures, and economic and other effects of the in-migration of individuals and families to avail of Project-related opportunities.

The Project will affect most aspects of the provincial, regional and local economies, including the provincial GDP, provincial taxes, incomes, employment and businesses. The main interactions between Project effect components and its various phases are summarized in Table 4.6. Note that transportation has no effects independent of those associated with transportation employment and expenditures.

**Table 4.6 Potential Interactions, Economy, Employment and Business VEC**

| Project Activities | Construction | Operation | Decommissioning | Accidental & Unplanned Events |
|---|---|---|---|---|
| **Employment** | ✓ | ✓ | ✓ | ✓ |
| **Expenditures** | ✓ | ✓ | ✓ | ✓ |
| **Transportation** | N/A | N/A | N/A | N/A |

### 4.2.1 Issues and Concerns

There is a widespread view that activity during the Construction and Operations phases should deliver economic benefits in adjacent communities, the Study Area and the province as a whole. This includes a desire for direct, indirect and induced employment and business opportunities, as well as for government revenues that might be used in support of economic and social programs.

These and other types of concerns were raised during stakeholder consultations (Appendix C) and are addressed in the following sections.

## 4.3 Existing Knowledge

There is considerable experience with the effects of large industrial projects on the economy, employment and business in the province, including experience within the Study Area, which, since 1990, has seen the construction of the Hibernia production platform, fabrication and installation of the Terra Nova topsides, component construction for the Voisey's Bay Mine/Mill, the White Rose construction project and the construction Newfoundland Transshipment Terminal.

The model used to measure economic impacts (Wade Locke Economic Consulting, 2007) was developed specifically for Newfoundland and Labrador-based resource projects and has been applied to the majority of large resource development projects, proposed or extant. The results have been the basis for the economic analyses undertaken for the environmental assessments of seven projects.

The broader socio-economic effects of large construction projects in the Study Area have also been well-documented (Shrimpton and Storey 1993, 2000, 2001; Storey 1995; Storey and Hamilton 2003; Storey *et al*. 1996) and shown to have had substantial positive economic effects on adjacent communities, the surrounding area and the province as a whole. Negative effects on the socio-economic environment have generally been avoided, or have been minor and of short duration.

## 4.4 Economy, Employment and Business Assessment

The economic impacts that flow through the economy emanate from Project expenditures associated with Vale Inco NL's activities in Newfoundland and Labrador. In addition, the sale of Vale Inco NL's intermediate and final outputs also generates economic impact. All of these impacts are further magnified as incomes earned by labour and businesses associated with the project are re-spent throughout the economy.

The model was applied for the Hydromet Plant and the Matte Plant. For each of these a summary of the economic impacts is given, followed by detailed discussion of the direct, indirect and induced employment effects, GDP, and taxation effects.

### 4.4.1 Economic Effects – Hydromet Plant

Table 4.7 summarizes the economic effects of the Hydromet Plant on the economy of Newfoundland and Labrador. A more detailed analysis of these effects is provided in the sections which follow.

**Table 4.7 Economic Effects, Hydromet Plant**

| Category | Impact |
|---|---|
| Direct Project employment – CAPEX[1] | 5,750 PY |
| Direct Project employment – OPEX[2] | 6,740 PY |
| Direct NL employment – CAPEX | 4,880 PY |
| Direct NL employment – OPEX | 6,400 PY |
| Total direct NL employment | 11,280 PY |
| Indirect NL employment | 13,810 PY |
| Induced NL employment | 8,720 PY |
| Total NL employment | 33,810 PY |
| Total direct NL labour income | $1,380 M |
| Indirect NL income | $1,460 M |
| Induced NL income | $740 M |
| Total NL income | $3,580 M |
| NL GDP | $20.7 B |
| NL mining taxes | $1.0 B |
| NL direct CIT[3] | $860 M |
| NL other Government revenue | $890 M |
| **Total NL Government Revenue** | **$2.8 B** |
| [1] Capital Expenditures<br>[2] Operational Expenditures<br>[3] Corporate Income Taxes | |

### 4.4.2 Direct Employment – Hydromet Plant

The investment expenditures associated with constructing the Hydromet Plant will generate direct, indirect and induced employment impacts, most of which are expected to accrue to workers in Newfoundland and Labrador. Indirect and induced employments impacts associated with capital and operating expenditures are analyzed in subsequent sections.

Figure 4.7 provides estimates for overall total direct employment as well an estimate for total direct employment in the province associated with the Construction Phase. Employment associated with the ongoing maintenance of the Project is considered in the discussion of indirect employment, as services associated with these functions will be contracted out by Vale Inco NL.

Construction will require 5,750 person-years of direct employment, of which approximately 85 per cent is expected to come from within the province. Peak employment is expected to occur in Year 3, with approximately 1,700 full-time equivalent jobs being created, 1,450 of which are assumed to come from within the provincial labour force.

The corresponding direct employment impacts associated with the Operations Phase are illustrated in Figure 4.8. The amount of direct employment expected over the productive life of the plant is 6,740 person-years, of which 95 per cent (6,400 person-years of employment) are expected to be drawn from the provincial work force. Figure 4.8 illustrates annual operating employment over the life of the Hydromet Plant. During a typical year of operations, 450 person-years of direct employment will be created, of which 420 are expected to be drawn from the provincial work force.

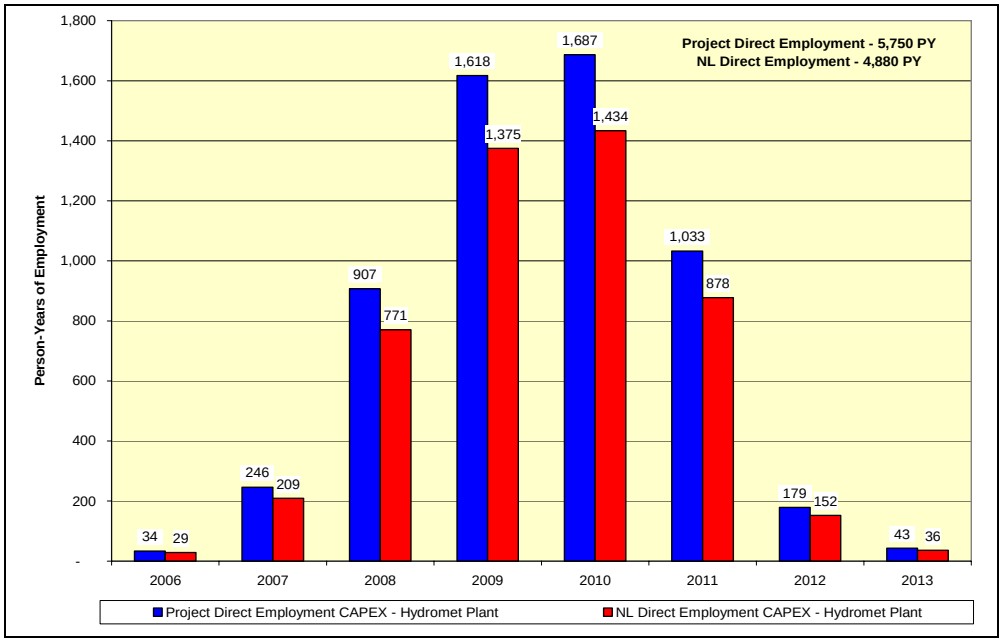


**Figure 4.7 Direct Project and Province-based Employment, Construction Phase, Hydromet Plant**

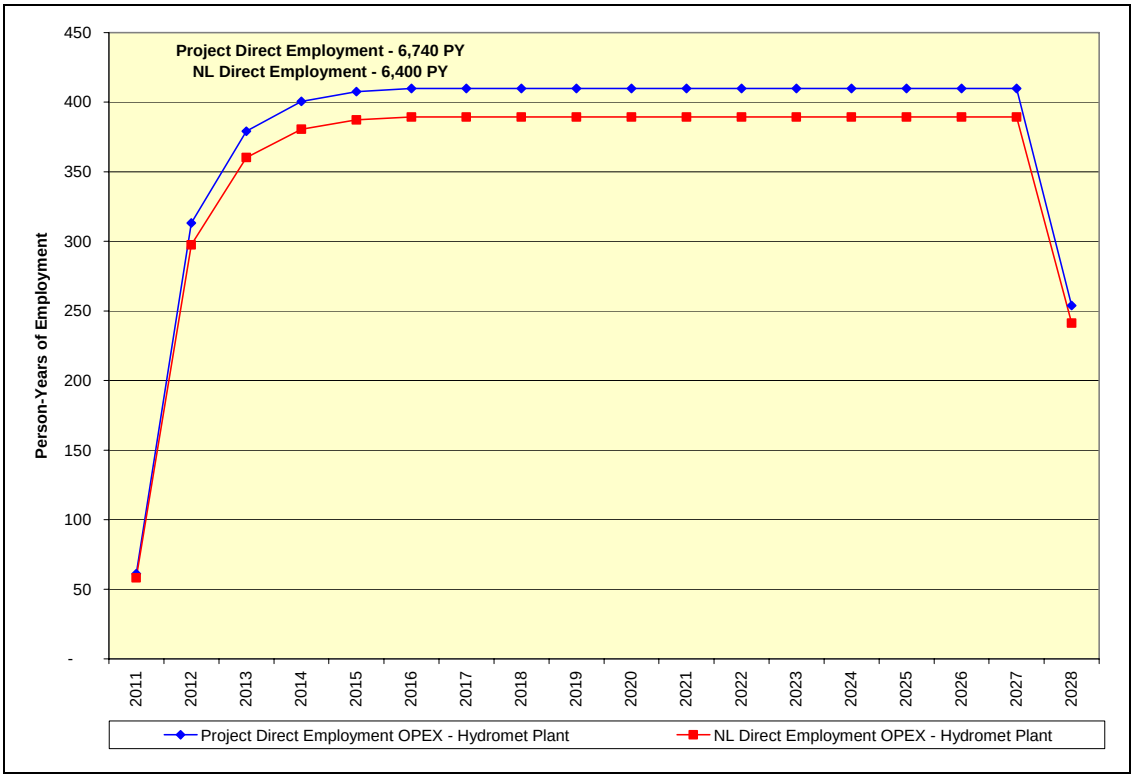


**Figure 4.8 Direct Project and Province-based Employment, Operations Phase, Hydromet Plant**

### 4.4.3 Indirect and Induced Employment – Hydromet Plant

Indirect and induced employment impacts associated with the construction and operation of the Hydromet Plant are contained in Table 4.8. Indirect employment impacts relate to the employment created in firms that supply goods and services during construction and operations, while induced employment is a measure of employment created in the general service economy as monies earned directly and indirectly by workers and businesses circulate through the economy.

**Table 4.8 Composition of Province-based Employment Supported by Capital and Operating Expenditures, Hydromet Plant**

| Category | Person-Years of Employment |
|---|---|
| NL direct employment - CAPEX | 4,880 PY |
| NL direct employment - OPEX | 6,400 PY |
| NL indirect employment | 13,810 PY |
| NL induced employment | 8,720 PY |
| **NL total employment** | **33,810 PY** |

The total direct provincial employment associated with the Hydromet Plant is 11,280 person-years. Added to this are 13,810 person-years of indirect employment created in firms supplying goods and services to the project and 8,720 person-years of employment supported throughout Newfoundland and Labrador as people spend their incomes earned directly or indirectly from the Project. Altogether, the Hydromet Plant will generate approximately 33,810 full-time equivalent jobs.

Figure 4.9 illustrates the time profile of province-based employment by type of employment effects (direct, indirect and induced). Peak employment occurs in 2010 when 4,160 person-years of employment are created. During the Construction Phase employment will average approximately 1,830 person-years annually; during the Operations Phase the Hydromet Plant will support more than 890 full-time equivalent jobs per year. Employment levels decline rapidly with the end of Operations and through the Decommissioning Phase, and will approach zero at Closure. The only remaining positions will be those associated with long-term monitoring of the Site.

### 4.4.4 GDP – Hydromet Plant

Gross Domestic Product (GDP) is used to determine of the effect of the Hydromet Plant on the overall provincial economy by measuring the value of the final product less the cost of production. It was not possible to isolate the impact of the processing plant from those being generated by the mining and milling activities in Labrador. Consequently, the results for GDP and also for Provincial revenues in this analysis are presented for the Integrated Project, which includes the mining and milling activities in Labrador and the processing activities on the Island. The estimated GDP impacts associated with the integrated project are provided in Table 4.9 and illustrated in Figure 4.10.

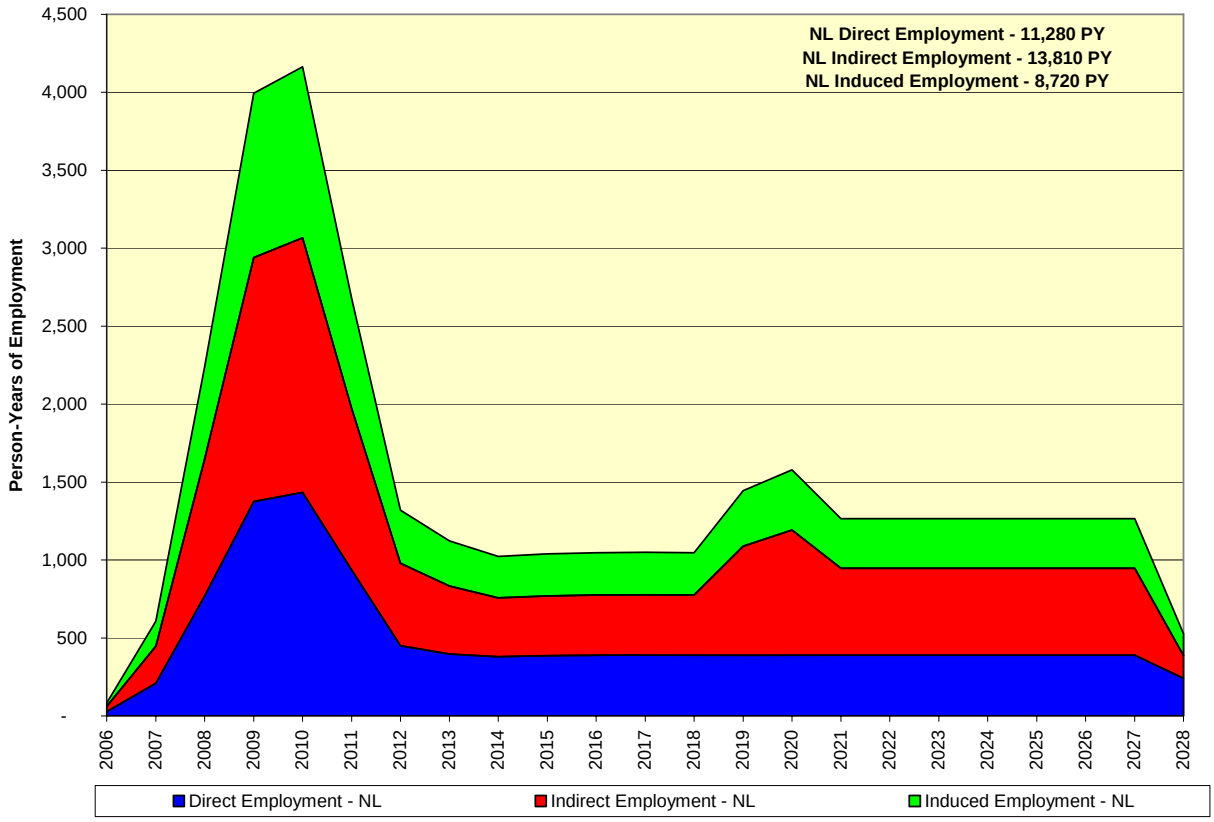


**Figure 4.9 Province-based Employment, by Type Supported by the Capital and Operating Expenditures, Hydromet Plant**

**Table 4.9 Composition of Provincial GDP from the Integrated Project (Mine, Mill and Processing), Hydromet Plant**

| Category | Millions of Dollars |
|---|---|
| From Production | $12,660 M |
| Direct income | $2,110 M |
| Indirect income | $3,060 M |
| Induced income | $1,340 M |
| Other income | $1,540 M |
| **Total income** | **$20,720 M** |

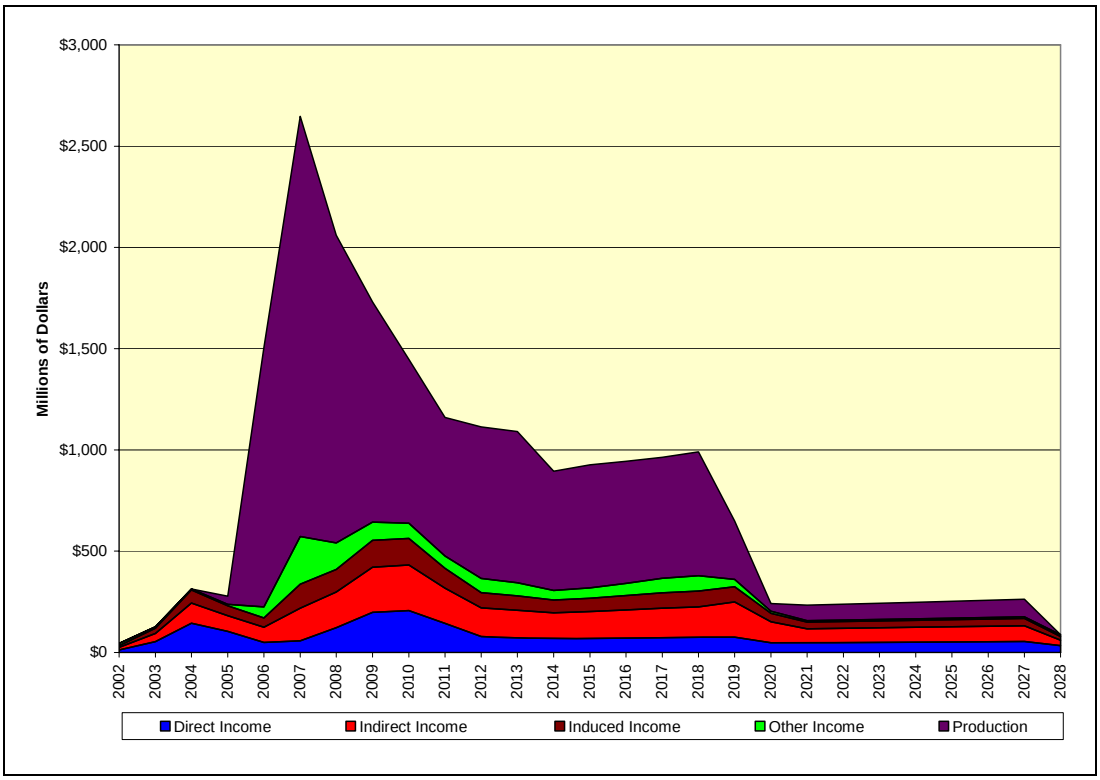


**Figure 4.10 Profile of Provincial GDP from the Integrated Project (Mine, Mill and Processing), Hydromet Plant**

The Integrated Project is expected to enhance provincial GDP by $20.7 billion at prices used in this analysis. The majority of the GDP impact ($12.7 billion) will be generated by the value of production in excess of production costs. Another $2.1 billion will be accounted for by people working directly with the Project during either Construction or Operations. A further $3.1 billion in GDP will emanate from firms that supply goods and services during Construction and Operations, and $1.3 billion will be generated by firms and workers in the general services sector. Royalty and Impact Benefits Agreements (IBA) payments (other income) will also generate an estimated $1.5 billion in provincial GDP.

The peak GDP effect from the Integrated Project will occur in 2007, assuming projected nickel prices during the life of the Integrated project (Wade Locke Economic Consulting 2007), with more than $2.6 billion in economic activity. Once mining activity in Labrador is completed, the impact of the Integrated Project will be significantly reduced.

### 4.4.5 Taxes – Hydromet Plant

Government revenue impacts are also estimated based on the Integrated Project; see Figure 4.11 and Figure 4.12. Construction and operations will yield in excess of $1 billion in mining taxes to the Province. Based on prices assumed for this analysis, over the life of the Project, the Government can also expect to receive more than $2.8 billion in revenues. In addition to the mining tax revenue (the largest single source of revenue) the Treasury can expect $860 million to be generated in direct

corporation income taxes. Another $890 million from other taxes and revenue bases will flow to the provincial Treasury from the construction and operation of the Integrated Project.

The largest single revenue impact, $530 million, occurs in 2007

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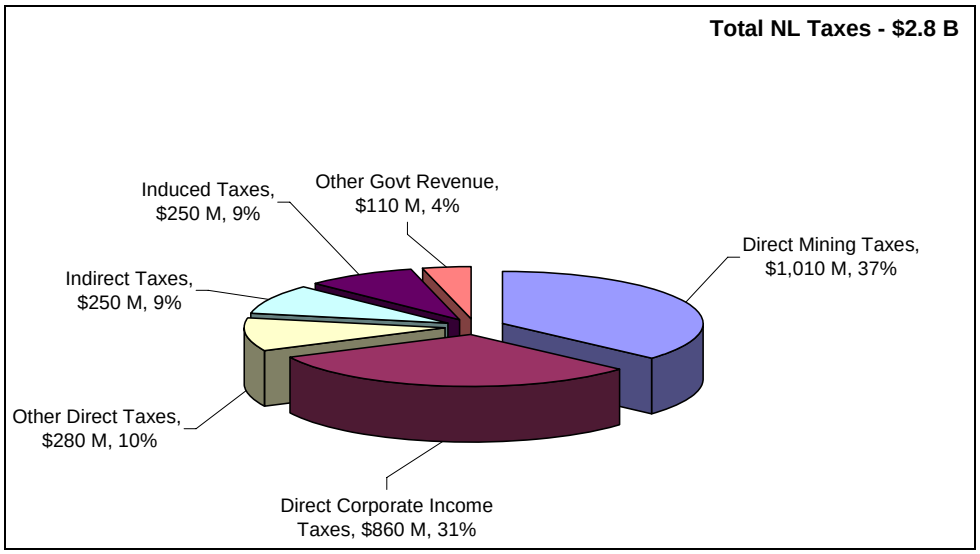


**Figure 4.11 Composition of Provincial Taxes from the Integrated Project (Mine, Mill and Processing), Hydromet Plant**

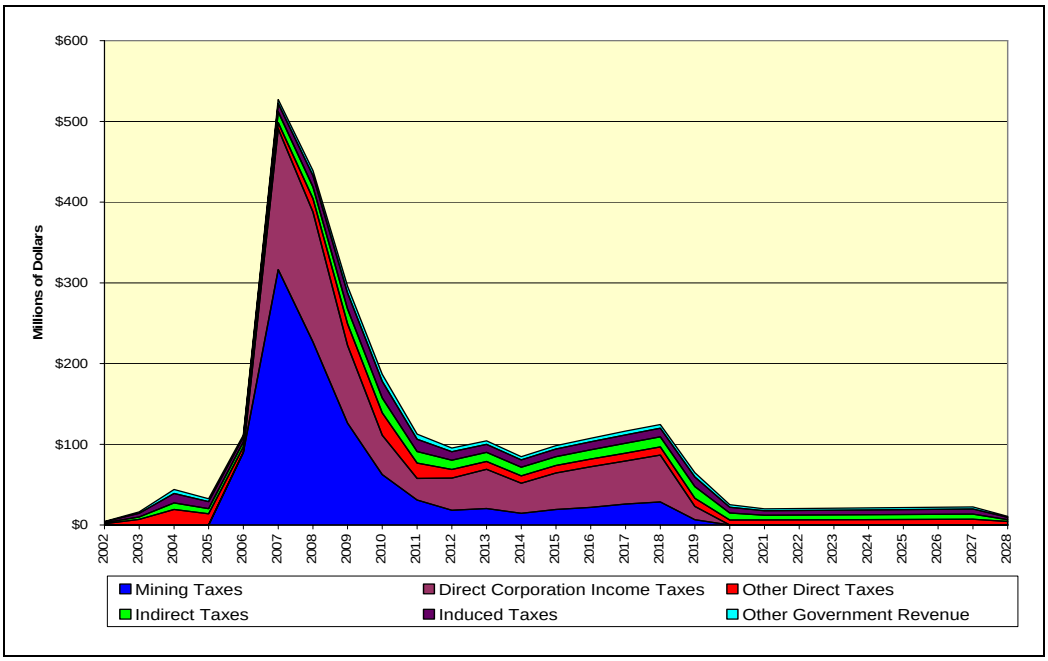


**Figure 4.12 Profile of Provincial Taxes from the Integrated Project (Mine, Mill and Processing), Hydromet Plant**

### 4.4.6 Provincial Labour Share Sensitivity Analysis

A key assumption used in the above base-case economic impact analysis is the share of direct labour that will come from Newfoundland and Labrador. During the construction of the Hydromet Plant it was assumed that 85 per cent of Project direct labour requirements would be supplied by workers from this province, an assumption based on historical averages obtained during the construction of the mine and mill in Labrador and the Demonstration Plant at Argentia. However, Newfoundland and Labrador (and Canada in general) is expected to experience a shortage of skilled labour as industrial and natural resource projects move towards development. In anticipation of such a labour shortage, a sensitivity analysis was conducted to quantify the economic impacts on labour, incomes and the treasury should the availability of provincially-based labour fall below the anticipated level. The sensitivity analysis involved recalculating economic impacts based on two alternative scenarios which assume, respectively, a 70 per cent and a 60 per cent provincial share of direct labour during construction.

The proportion of the Operations Phase work force drawn from the province is projected to be 95 per cent. This is based on experience with employment at the Argentia Demonstration Plant, and Vale Inco NL plans to transfer these workers to the processing plant and train other local employees to meet Project needs. This percentage is believed to be achievable for the full process-plant operations, and thus the assumption is held constant in the sensitivity analysis. Table 4.10 illustrates the effects of each of these scenarios and compares them against the base case results.

As Table 4.10 illustrates, under the 60 per cent labour share assumption, the total direct provincial employment will be reduced by 6 per cent (2,060 person-years). Direct employment during the

Construction Phase will be reduced by 29 per cent (over 1,400 person-years). Income to Newfoundland and Labrador factors of production will drop by a similar proportion, over $225 million, while taxes to the Newfoundland and Labrador Treasury will be reduced by $36 million.

While the 85 per cent assumption may be challenged if a significant number of other projects come on-stream at the same time and there is significant competition for labour, the 60 per cent assumption is seem as a extreme "worst-case scenario" and unlikely.

It should also be recognized that these decreases are not real losses to the provincial economy. If labour is not available within the province, then it is assumed that this labour force is employed elsewhere. Assuming that those jobs are still within the province, then the Treasury will still benefit in similar ways as under the base case scenario, but from different sources.

### 4.4.7 Economic Effects – Matte Plant

Table 4.11 summarizes the economic effects of the Matte Plant on the economy of Newfoundland and Labrador. A more detailed analysis of these effects is provided in the sections which follow.

**Table 4.10 Sensitivity Analysis: Provincial Labour Share of Direct Construction Employment, Hydromet Plant**

| | Base Case NL employment @ 85% | NL Employment @ 70% | Change (85 to 70%) | NL Employment @ 60% | Change (85 to 60%) |
|---|---|---|---|---|---|
| **Employment** | | | | | |
| Direct CAPEX | 4,884 | 4,022 | 862 | 3,447 | 1,436 |
| Direct OPEX | 6,398 | 6,398 | - | 6,398 | - |
| Indirect CAPEX | 8,455 | 8,455 | - | 8,455 | - |
| Indirect OPEX | 5,358 | 5,358 | - | 5,358 | - |
| Induced | 8,716 | 8,342 | 374 | 8,092 | 624 |
| Other | - | - | - | - | - |
| **Total Employment - NL** | **33,812** | **32,576** | **1,236** | **31,751** | **2,060** |
| | | | | | |
| **Income** | | | | | |
| Direct CAPEX | 609 | 501 | 107 | 430 | 179 |
| Direct OPEX | 772 | 772 | - | 772 | - |
| Indirect CAPEX | 742 | 742 | - | 742 | - |
| Indirect OPEX | 716 | 716 | - | 716 | - |
| Induced | 738 | 710 | 28 | 692 | 47 |
| Other | - | - | - | - | - |
| **Total Income - NL** | **3,578** | **3,442** | **135** | **3,352** | **226** |
| | | | | | |
| **GDP** | **4,699** | **4,564** | **135** | **4,474** | **226** |
| | | | | | |
| **Taxes** | | | | | |
| Direct PIT | 158 | 146 | 12 | 138 | 20 |
| Direct payroll | 28 | 25 | 2 | 24 | 4 |
| Indirect | 125 | 125 | - | 125 | - |
| Induced | 135 | 130 | 5 | 127 | 9 |
| Other | 57 | 55 | 2 | 54 | 3 |

**Table 4.11 Summary Economic Effects, Matte Plant**

| Category | Impact |
|---|---|
| Direct Project employment – CAPEX | 4,950 PY |
| Direct Project employment – OPEX | 6,140 PY |
| Direct NL employment – CAPEX | 4,210 PY |
| Direct NL employment – OPEX | 5,830 PY |
| Total direct NL employment | 10,030 PY |
| Indirect NL employment | 11,710 PY |
| Induce NL employment | 7,370 PY |
| Total NL employment | 29,110 PY |
| Total direct NL labour income | $1,230 M |
| Indirect NL income | $1,170 M |
| Induce NL income | $620 M |
| Total NL income | $3,020 M |
| NL GDP | $18.5 B |
| NL mining taxes | $1.0 B |
| NL direct CIT | $810 M |
| NL other government revenue | $820 M |
| **Total NL Government Revenue** | **$2.7 B** |

### 4.4.8 Direct Employment – Matte Plant

The investment expenditures associated with Matte Plant construction would generate direct, indirect, and induced employment impacts, most of which would accrue to provincial workers. Indirect and induced employment impacts associated with capital and operating expenditures are analyzed in subsequent sections.

The construction of the Matte Plant would require 4,950 person-years of direct employment, of which approximately 85 per cent (4,210 person-years) would be filled by members of the provincial labour force. As shown in Figure 4.13, peak employment is expected to occur in Year 3, when 1,500 full-time equivalent jobs will be created, of which nearly 1,270 are anticipated to be filled by the provincial labour force.

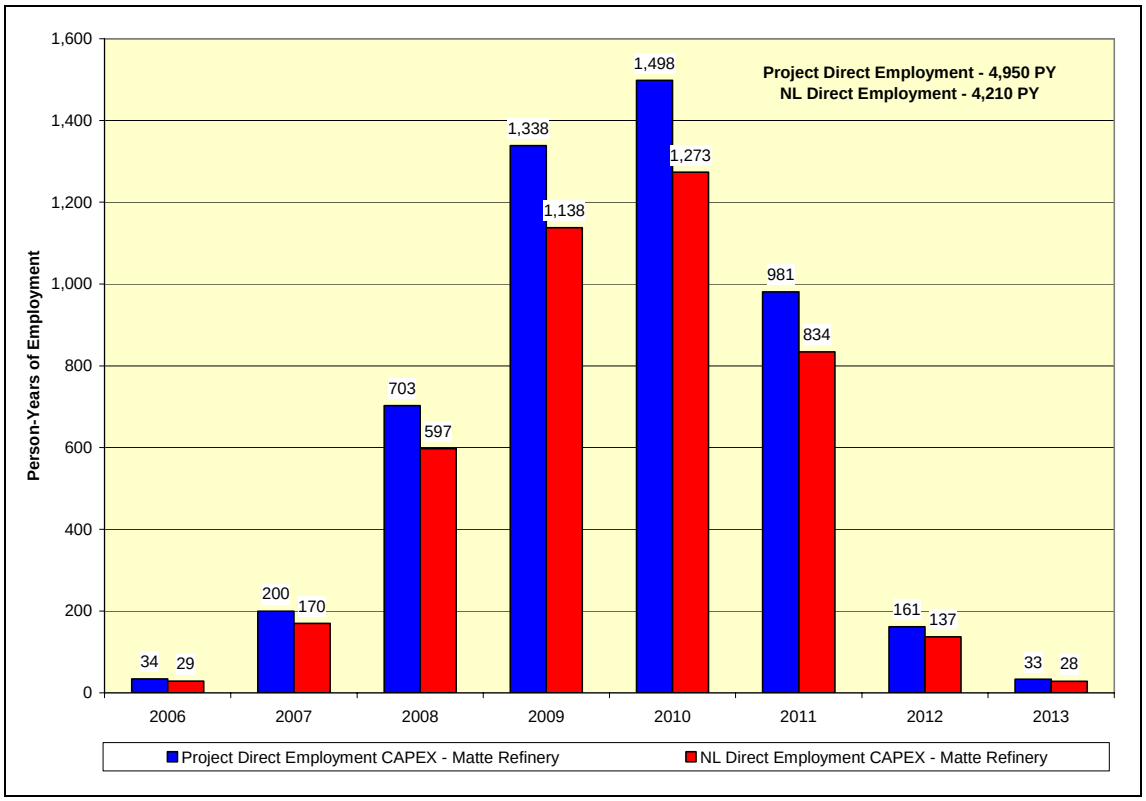


**Figure 4.13 Direct Project and Province-based Employment, Construction Phase, Matte Plant**

The corresponding direct employment impacts associated with the on-going operations of the Matte Plant are illustrated in Figure 4.14. Direct employment expected over the productive life of the plant would be 6,140 person-years, of which slightly more than 95 per cent (5,830 person-years) would be drawn from the provincial labour force.

Figure 4.14 illustrates annual employment from operations over the life of the Matte Plant. During a typical year of operations, 400 person-years of direct employment would be created, of which 370 would be drawn from the provincial labour force.

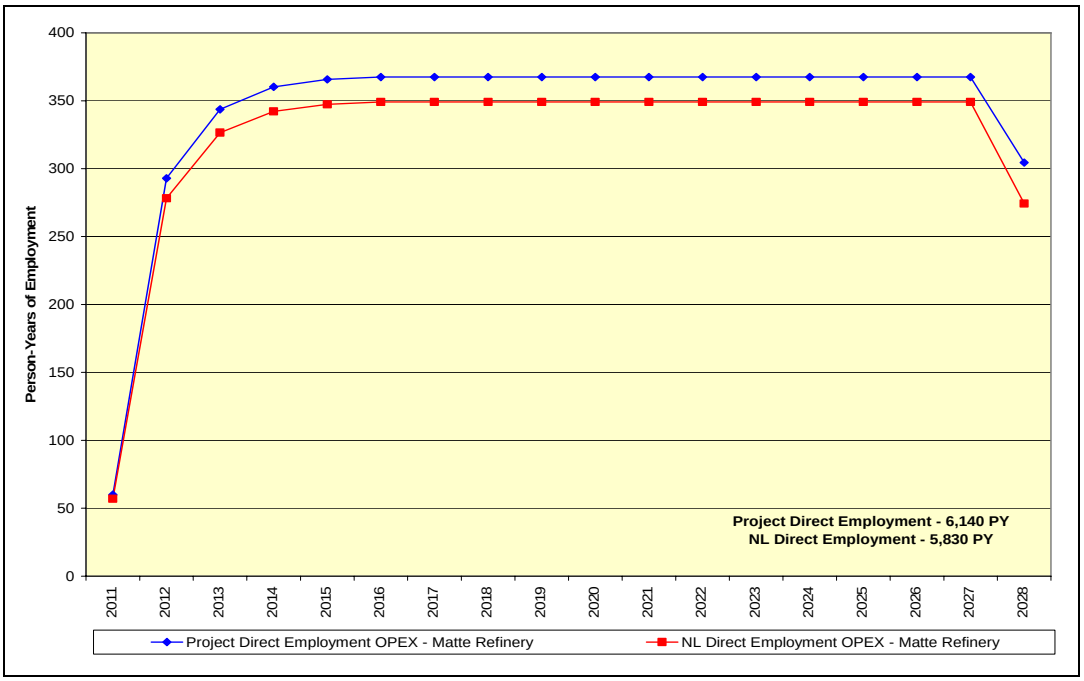


**Figure 4.14 Direct Project and Province-based Employment, Operations Phase, Matte Plant**

### 4.4.9 Indirect and Induced Direct Employment – Matte Plant

Indirect and induced employment effects associated with the construction and operations of the Matte Plant are illustrated in Figure 4.15. Indirect employment impacts relate to the employment created in firms that would supply goods and services to the Matte Plant during construction and operations, while induced employment is a measure of employment created in the general service economy as monies earned directly and indirectly by workers and businesses circulate throughout the economy.

The total direct provincial employment associated with the Matte Plant would be 10,030 person-years. Added to this are 11,710 person-years of indirect employment created in firms supplying goods and services to the Project and 7,370 person-years of induced employment as people spend their incomes earned directly or indirectly from the Project. Altogether the Matte Plant is estimated to generate approximately 29,110 full-time equivalent jobs in Newfoundland and Labrador.

Figure 4.15 illustrates the time profile of province-based employment by type of employment impacts – that is, whether the employment occurs directly or indirectly, or is induced. Peak employment would occur in Year 3, when 3,650 person-years of employment would be created. On average, the Matte Plant would support more than 810 full-time equivalent jobs per year during Operations and would average nearly 1,740 per year during Construction.

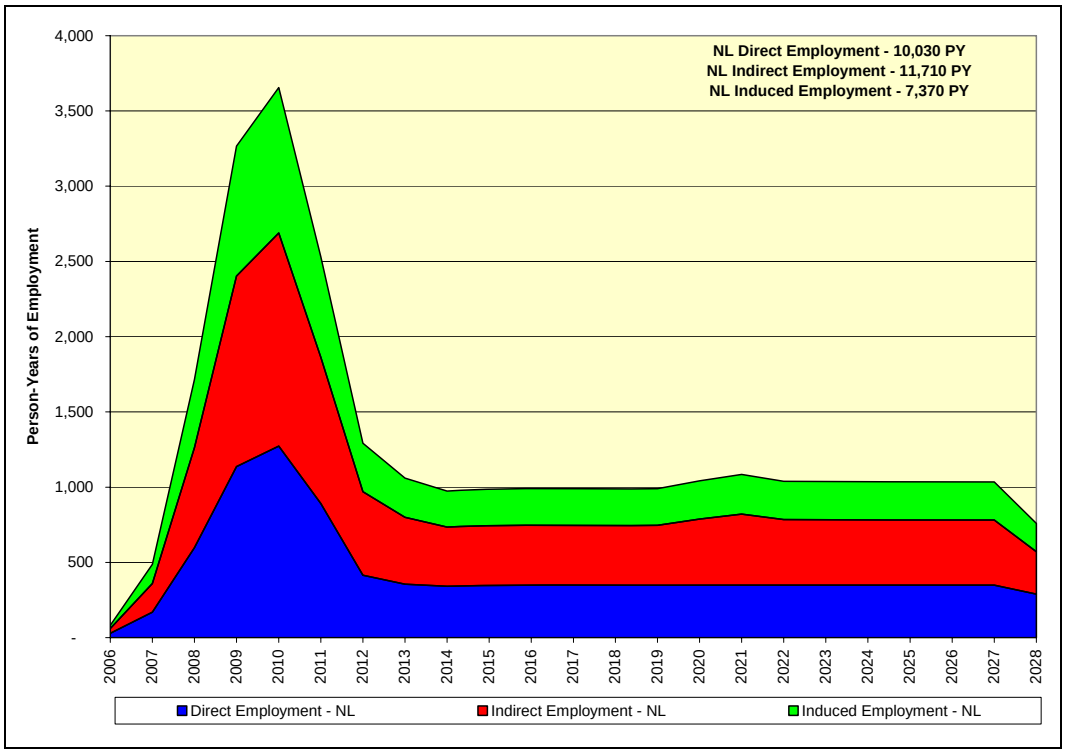


**Figure 4.15 Province-based Employment by Type Supported by the Capital and Operating Expenditures, Matte Plant**

### 4.4.10 GDP – Matte Plant

The estimated GDP impacts associated with the Integrated Project are provided in Table 4.12 and illustrated in Figure 4.16. At prices used in this analysis, the Integrated Project would be expected to enhance the provincial GDP by $18.5 billion, the majority ($11 billion) generated by the value of production in excess of the costs incurred to produce the final product and another $2.0 billion in GDP accounted for by people working directly with the Project during either Construction or Operations. Further, $2.8 billion from firms that supply goods and services to the Matte Plant during Construction and Operations, $1.2 billion would be generated by firms and workers in the general services sector, and royalty and IBA payments (other income) would generate an estimated $1.5 billion in provincial GDP.

As with the Hydromet Plant, the peak GDP impact, from the Integrated Project would occur in 2007, assuming projected nickel prices during the life of the Integrated Project (Wade Locke Economic Consulting 2007), with more than $2.6 billion in economic activity recorded in Newfoundland and Labrador. Once mining activity in Labrador is completed, the impact of the Integrated Project on the Province's GDP will be significantly reduced.

**Table 4.12 Composition of Provincial GDP from the Integrated Project (Mine, Mill and Refinery), Matte Plant**

| Category | Millions of Dollars |
|---|---|
| From production | $11,030 M |
| Direct income | $1,960 M |
| Indirect income | $2,770 M |
| Induced income | $1,230 M |
| Other income | $1,540 M |
| **Total income** | **$18,540 M** |

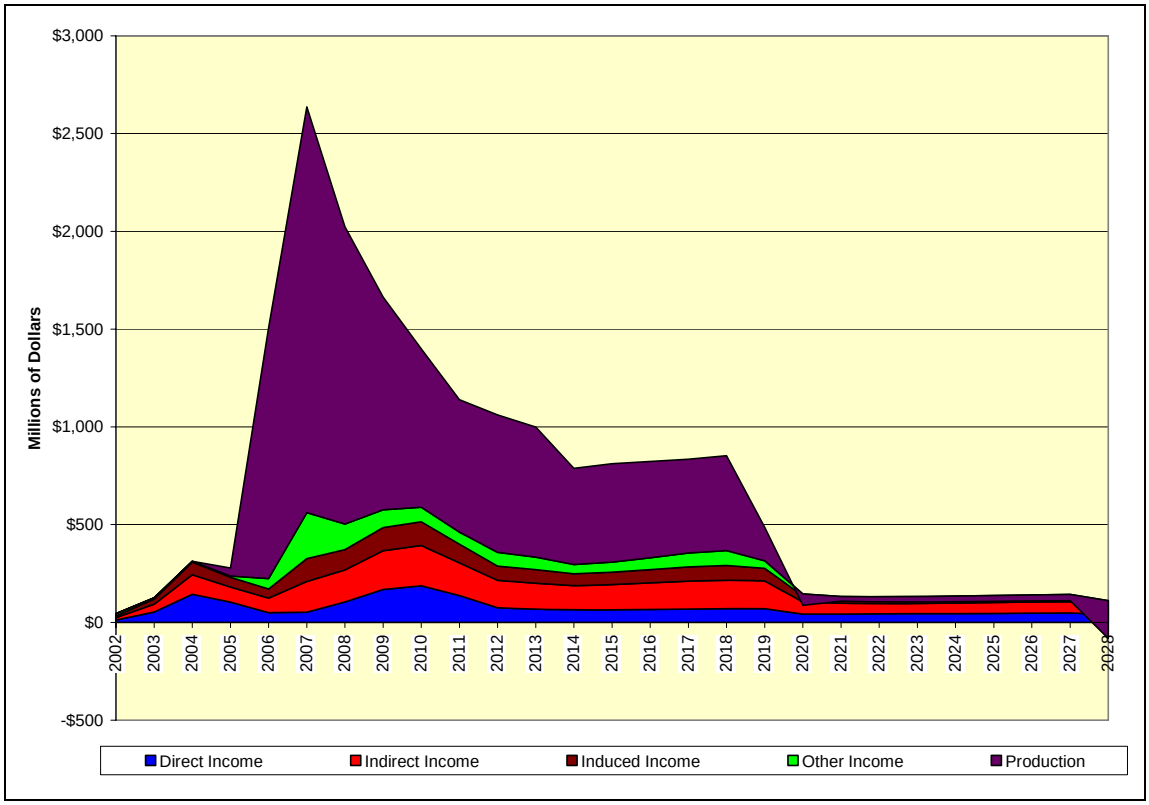


**Figure 4.16 Profile of Provincial GDP from the Integrated Project (Mine, Mill and Processing), Matte Plant**

### 4.4.11 Taxes – Matte Plant

As previously noted, government revenue impacts are estimated based on the Integrated Project. The results of this assessment are illustrated in Table 4.13 and Figure 4.17. Based on the prices assumed for this analysis, the development and operations of the Integrated Project using the Matte Plant option would yield in excess of $1 billion in mining taxes to the Government of Newfoundland and Labrador. Over the life of the Integrated Project, the Province would expect to receive more than $2.6 billion in revenues. In addition to the mining tax revenue (the largest single source of revenue), theTreasury would

expect $810 million to be generated in direct corporation income taxes and approximately $820 million from other tax and revenue bases. The largest single revenue impact from the Integrated Project would occur in 2007, assuming projected nickel prices during the life of the Integrated Project (Wade Locke Economic Consulting 2007), when nearly $530 million in revenues would flow to the provincial treasury.

**Table 4.13 Composition of Provincial Taxes from the Integrated Project (Mine, Mill and Processing), Matte Plant**

| Category | Millions of Dollars |
|---|---|
| NL mining taxes | $1,020 M |
| Direct NL corporate income taxes | $810 M |
| Other direct NL taxes | $260 M |
| Indirect NL taxes | $230 M |
| Induced NL taxes | $230 M |
| Other NL Government revenue | $100 M |
| **Total NL Government revenue** | **$2,650 M** |

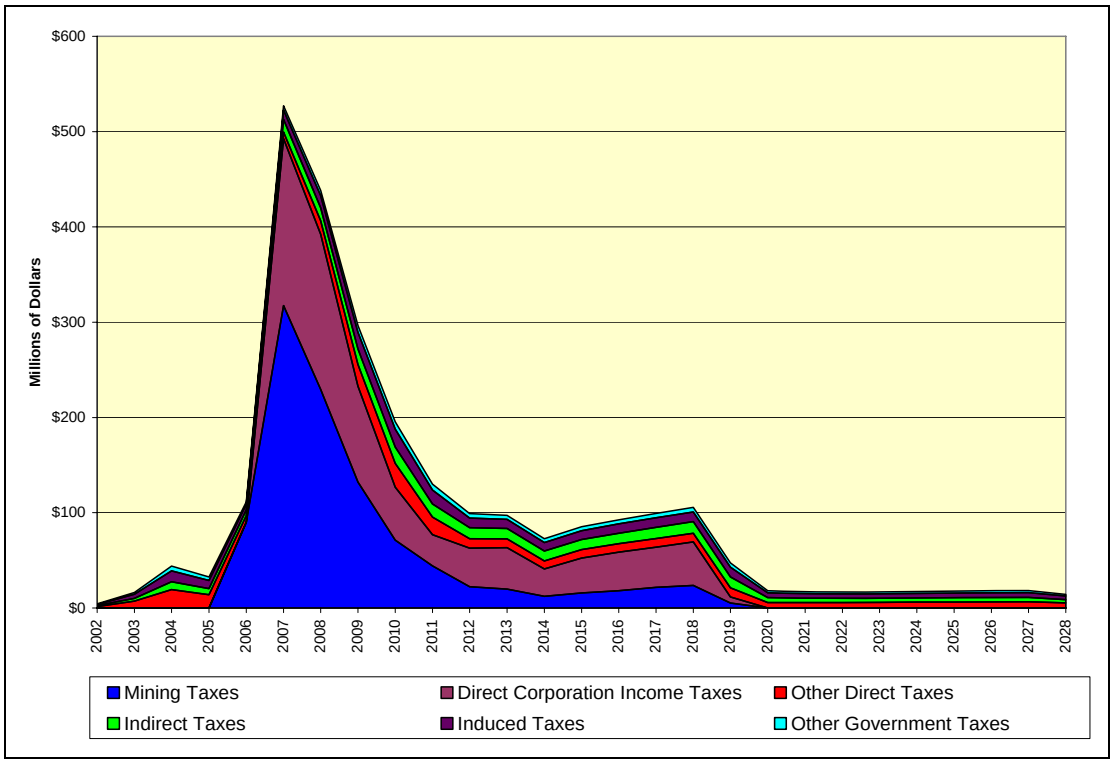


**Figure 4.17 Profile of Provincial Taxes from the Integrated Project (Mine, Mill and Processing), Matte Plant**

### 4.4.12 Provincial Labour Share Sensitivity Analysis, Matte Plant

No comparable sensitivity analysis is included for the Matte Plant case. If less than the 85 per cent Newfoundland and Labrador labour content is achieved during construction as assumed in the base case, the decreases in employment, income, GDP and taxes for the two alternative scenarios for the Matte Plant will always be less than those for the Hydromet Plant. The Hydromet Plant therefore represents the "worst-case" option with respect to this particular issue.

### 4.4.13 Labour Demand and Supply

#### Construction Labour Demands

The Construction phase, which overlaps the initial year of Operations, will require workers from several occupational categories, including direct and indirect trades, Engineering, Procurement and Construction Management (EPCM), owner and operations employment (Table 4.14). Included in EPCM, owner and operations employment is engineering, technical, building trades and administration. Data here are provided for the Hydromet Plant option. Similar occupations would be required for the Matte Plant, but somewhat fewer workers would be required in total.

Construction phase employment also includes those involved in the construction and operation of the Construction Accommodations. Projected employment levels for these activities are given in Table 4.15.

#### Operations Labour Demands

The Hydromet Plant will operate 24 hours a day. Direct employment during the Operations Phase will require a range of occupations, including engineering and technical, operations, maintenance and administrative personnel. Table 4.16 summarizes the estimated employment demand, by trade and year, for this phase of the Project for the Hydromet Plant. Similar occupation groups would be required for the Matte Plant.

#### Construction Labour Supply

There is an adequate provincial labour supply to meet most Project demands if this were a stand-alone construction project. However, a shortage of skilled labour for major industrial projects has been identified as a key challenge to realizing long-term provincial economic prosperity. All existing and new projects are expected to experience labour shortages (Skills Task Force 2007).

This is a provincial, national and global issue. The labour market in Canada for skilled trades is facing shortages and there is competition for labour across the country, given the compounding effects of an aging population, declining birth rates and a general lack of interest in skilled trade occupations. Out-migration of skilled workers, especially to Alberta, compounds the issue in Newfoundland and Labrador.

## Table 4.14 Project Labour Demand, by Occupation, Construction Phase, Hydromet Plant*

| Trades | NOC Code | Person-Years | | | |
|---|---|---|---|---|---|
| | | Year 1 | Year 2 | Year 3 | Year 4 |
| **Direct Trades** | | | | | |
| Bricklayers | 7281 | n/r | 10 | 20 | 4 |
| Iron Workers | 7264 | 80 | 140 | 120 | 50 |
| Plumbers and pipefitters | 7251 | 35 | 75 | 150 | 125 |
| Electricians | 7241 | 40 | 80 | 130 | 100 |
| Labourers | 7611 | 60 | 125 | 125 | 100 |
| Carpenters | 7271 | 60 | 125 | 80 | 50 |
| Millwrights | 7311 | 10 | 50 | 80 | 60 |
| Operating engineers | 7421 | 60 | 70 | 60 | 40 |
| Boilermakers | 7292 | 15 | 60 | 80 | 70 |
| Insulators | 7293 | n/r | n/r | 10 | 6 |
| Painters | 7294 | n/r | 5 | 5 | 5 |
| Sheet metal workers | 7261 | n/r | 50 | 50 | 20 |
| Instrument technicians | 2243 | n/r | n/r | 80 | 60 |
| **Total Direct Trades** | | **360** | **790** | **990** | **690** |
| **Indirect Trades** | | | | | |
| Bussing | 7412 | 6 | 12 | 16 | 11 |
| Janitorial/Outhouse | 6663 | 5 | 14 | 14 | 14 |
| Bulks | 7611 | 3 | 10 | 13 | 10 |
| Water Supply/Delivery | 7611 | 2 | 5 | 5 | 5 |
| Waste management | 7611 | 1 | 3 | 4 | 4 |
| Perm. plant maintenance | 7445 | n/r | 2 | 5 | 3 |
| Medical | 3152 | 1 | 2 | 2 | 2 |
| Security | | 12 | 17 | 17 | 17 |
| **Total Indirect Trades** | | **30** | **65** | **76** | **66** |
| | | | | | |
| **Total Direct and Indirect Trades** | | **390** | **855** | **1,066** | **756** |
| **EPCM** | | **265** | **350** | **300** | **108** |
| **Owners** | | **80** | **103** | **99** | **84** |
| **Operations** | | **0** | **0** | **215** | **410** |
| **Total** | | **735** | **1,308** | **1,680** | **1,358** |

**Notes:** Initial operations employment overlaps last year of construction phase.
There will be similar employment by occupational group for the Matte Plant within ± 5%.

## Table 4.15 Labour Demand: Construction and Operation of Construction Accommodations Complex Requirements

| Construction | Number Required | Operations | Number Required |
|---|---|---|---|
| Construction manager | 1 | Manager | 1 |
| Field administration assistant | 1 | Shift supervisors | 4 |
| Operating engineers | 4 | Security | 4 |
| Sheet metal workers | 8 | Medical staff | 4 |
| Carpenters | 10 | Kitchen staff | 12 |
| Labourers | 8 | Housekeeping staff | 8 |
| Electricians | 2 | Janitorial staff | 8 |
| Mechanics | 2 | Maintenance staff | 4 |
| Pipefitters | 4 | | |
| **Total** | **40** | **Total** | **45** |

## Table 4.16 Project Labour Demand, by Occupation, Operations Phase, Hydromet Plant

| **Commercial Hydromet Plant - Operations** | | |
|---|---|---|
| **Occupation** | **NOC Code** | **Number** |
| ***Engineering/Technical*** | | |
| Concentrate preparation/Tailings superintendent | 9211 | 41 |
| Refining superintendent | 9211 | |
| Safety/Training coordinator | 9211 | |
| Safety supervisor | 9211 | |
| Technical superintendent | 9211 | |
| Production planner | 9211 | |
| Metallurgist | 2142 | |
| Metallurgical clerk | 2212 | |
| Technologists | 2112 | |
| Product chemists | 2112 | |
| Chemical analysts | 2112 | |
| ***Operations*** | | |
| Plant operators | 9231 | 261 |
| Heavy equipment operator | 7421 | |
| Warehouse | 1471 | |
| Utilities | 7611 | |
| Janitors | 6663 | |
| Ship offloading and storage | 7452 | |
| ***Maintenance*** | | |
| Maintenance superintendent | 0721 | 100 |
| Administrative assistant | 1241 | |
| Mechanical engineer | 2132 | |
| Electrical engineer | 2133 | |
| Process control engineer | 2148 | |
| Maintenance planner | 7219 | |
| Shop supervisor | 7219 | |
| Machinist | 7311 | |
| Millwright | 7311 | |
| Welder | 7265 | |
| Pipefitter | 7251 | |
| Mobile equipment mechanic | 7312 | |
| Electrician | 7241 | |
| Instrumentation | 2243 | |
| Maintenance supervisor | 7219 | |
| ***Administration*** | | |
| Manager | 0114 | 48 |
| Administrative assistant | 1241 | |
| Environment Health and Safety superintendent | 9211 | |
| Environmental chemist | 2112 | |
| Technologist | 2211 | |
| Occupational Health nurse | 3152 | |
| Logistics superintendent | 9211 | |
| Yards and port superintendent | 9211 | |
| Purchasing agent | 1474 | |
| Human Resources superintendent | 1121 | |
| Human Resources specialist | 1121 | |
| Information systems | 2171 | |
| Accounting | 1111 | |
| Security | 6651 | |
| **Total Personnel** | | **450** |

**Source:** Voisey's Bay Nickel Company Limited.

In terms of the provincial share of construction employment, the skilled labour market is dynamic, and labour supply and demand will present difficulties across Canada between 2008 and 2011 (Construction Sector Council 2007; Skills Task Force 2007). The Skills Task Force Report investigated occupations for which there will be shortfalls in planned industrial projects, and determined that there will be a shortage of civil engineers, electricians, plumbers, iron workers, welders, concrete finishers, carpenters, stationary engineers and truck drivers in particular.

Low participation rates of women in skilled trade occupations are another concern. If the Province is to supply the work force to meet demand from this and other projects, it will need to find ways to train and attract female workers.

**Operations Labour Supply**

Most of the operations personnel for the Project are expected to be drawn from within Newfoundland and Labrador. Some will transfer from the Argentia Demonstration Plant, while training and recruitment during the Construction Phase will help ensure an adequate supply for operations. Operations are scheduled to begin in 2011, which gives sufficient lead time to source and train people.

**Cumulative Labour Demand/Supply Effects of Other Projects**

Table 4.17 illustrates the potential labour demands from other projects that could affect the labour supply. Projects included are those which have been publicly announced, or are well advanced in the planning stages and reasonably foreseeable. Those projects that are currently operating, including the Hibernia, Terra Nova and White Rose offshore oilfields and the Iron Ore Company of Canada mining operations in Labrador, are not included as they are part of the baseline conditions and it is unlikely that these workers will leave to work on the Project.

Although these projects were included in the Skills Task Force (2007) Scenario 2, their labour demands do not fluctuate between 2006 and 2016. Instead, it is the construction and operation labour demands of new projects that change over that period. Those considered in this assessment are the Hebron offshore oilfield project, the Lower Churchill hydroelectric generation project and the Newfoundland and Labrador Refinery project (Placentia Bay), cumulatively with the Project.

The Skills Task Force Report provides an overview of each of these proposed projects. Table 4.17 indicates that aggregate labour demands from future projects will peak at approximately 9,000 in the period 2008 to 2011.

Scenario 2 predicts the peak construction labour demands from these projects will occur in 2010, with a requirement for 12,000 workers, and a slightly smaller peak (a requirement for approximately 10,000 employees) in 2013, when the Hebron construction phase is anticipated to begin. During the 30-to-40 year operations phases for the future projects, annual labour demand of 2,050 to 2,250 workers will be maintained.

**Table 4.17 Summary of Economic Components of Proposed Projects in Newfoundland and Labrador**

| Project | Location | Labour Demand | | Total Investment | Timeline | |
|---|---|---|---|---|---|---|
| | | Construction | Operations | | Construction | Operations |
| Hebron | Offshore | 2,500 | 800 - 900 | $10 billion | 2012 - 2015 | 2015+ |
| Lower Churchill1 | Labrador | 2,000 | <100 | $6-9 billion | 2009 - 2019 | 2015+ |
| NL Refinery | Placentia Bay | 3,000 | 750 | $4.6 billion | 2008 - 2011 | 2011 onward for 30+ years |
| Voisey's Bay Project | Long Harbour | 1,500 | >400 | > $2 billion | 2008 - 2011 | 2011 - 2026 |
| **TOTAL** | | **9,000** | **2,050 - 2,250** | **> $22 billion** | **2008 - 2011** | **2011+** |

**Sources:** Skills Task Force (2007); Registration documents.

The initiatives offered in the Skills Task Force Report to address labour issues will need to be successful in order for all projects to proceed within the same time frame. The Construction Sector Council's labour requirements report for the period 2007 to 2015 indicates that the cumulative effect will not ease in the near term and will be compounded by construction of other large projects across Canada between 2007 and 2009, particularly in Alberta, British Columbia, Nova Scotia, New Brunswick and Manitoba. There will be strong competition from these and other parts of the country for workers in trades associated with industrial, institutional and engineering/civil projects in this medium-term. The report (Construction Sector Council, 2007) states that, with this intense competition, labour will be attracted to the strongest markets and that the number of skilled workers will fall short of needs across the country.

The projection by the Construction Sector Council for all of Canada is consistent with that of the Skills Task Force, and indicates a tight labour market in Newfoundland and Labrador during overlapping construction periods.

Labour supply challenges are also attributed to impending retirements of baby-boomers between 2006 and 2015, reducing by 25 per cent the 2006 construction labour force in Newfoundland and Labrador, the highest rate of all Canadian provinces. In fact, the replacement component of total demand is larger than the demand from new projects (Construction Sector Council 2007).

Demographic changes also contribute to long-term labour market challenges. The population of the Study Area fell by 12 per cent between 1996 and 2001 and an additional 6.5 per cent from 2001 to 2006, due in part to out-migration, lower birth rates and higher death rates. Provincially, out-migration is also significant: 22 per cent at the university undergraduate level and from 20 per cent to 14 per cent at the college level (Skills Task Force 2007).

The Skills Task Force report (2007) outlined other factors contributing to shortages of skilled labour in the province:

- Attitudes towards trades employment negatively affecting enrolments in trades colleges;

- Shortage of long-term, continuous employment opportunities;
- Shortage of information about provincial employment opportunities;
- Aggressive recruitment by other provinces and companies;
- A certification process that compromises the ability of an individual to become an apprentice or journeyperson, resulting in apprentices leaving the province for larger job markets so that they can become certified or find meaningful work without certification;
- Low literacy and numeracy levels, limiting the ability to obtain work; and
- Women, Aboriginal people, persons with disabilities, low-skilled workers and older workers having lower participation rates than do men in skilled trades occupations.

If all construction phases of the projects in Newfoundland and Labrador conclude at approximately the same time, with no other jobs available, there will be another out-migration of workers. The lack of sustained employment over the long term has been identified as one of the reasons why skilled trades-people are reluctant to return to the province for work.

### 4.4.14 Business

The Hydromet Plant will generate $3.1 billion in total GDP from firms that supply goods and services during Construction and Operations, with an additional $1.3 billion generated by firms in the general services sector. The Matte Plant option would generate $2.8 billion from goods and services and another $1.2 billion from firms in the general services sector (Wade Locke Economic Consulting, 2007).

The types of goods and services required during Construction and Operations are indicated in Table 4.18. Some of these types of service will also be required in the construction and operation of construction accommodations.

The preference of Vale Inco NL is to source these services locally to the extent that capacity exists. The effect will be an increase in local, regional and provincial businesses through direct demands, or through indirect demands of workers or associated businesses.

As indicated in Section 4.1, there are a number of industrial and construction-related companies in the Study Area that could take advantage of business opportunities associated with the Project. Some new businesses are expected to establish in the area, while larger or more specialized existing companies may be able to supply and service the Project from elsewhere in the province, particularly the St. John's region.

**Table 4.18 Construction, Operations and Support Service Requirements**

| Construction | Operations | Construction Support Services |
|---|---|---|
| • Earthworks<br>• Wharf development<br>• Concrete supply<br>• Process buildings<br>• Mechanical, piping, electrical, instrumentation and controls<br>• Security services<br>• Materials handling<br>• Fencing<br>• Tanks<br>• Concrete-testing services<br>• Survey services<br>• Geotechnical services<br>• NDT services<br>• Environmental services | • Accommodations<br>• Laundry services<br>• Food and beverage<br>• Warehousing<br>• Propane supply<br>• Fuel supply<br>• Safety supplies<br>• Rubber lining<br>• Trucking/Transportation<br>• Logistics management<br>• Security services<br>• Maintenance services<br>• Courier service<br>• Janitorial services<br>• Waste management<br>• Snow-clearing<br>• Water supply<br>• Dust suppression<br>• Stevedoring<br>• Equipment rental<br>• Survey services<br>• Geotechnical services<br>• Environmental services | • Accommodations<br>• Laundry services<br>• Food and beverage<br>• Warehousing<br>• Propane supply<br>• Fuel supply<br>• Safety supplies<br>• Brush-cutting<br>• Rubber lining<br>• Construction supplies<br>• Trucking/Transportation<br>• Logistics management<br>• Painting/Sandblasting<br>• Bussing<br>• Courier service<br>• Janitorial services<br>• Waste management<br>• Snow-clearing<br>• Water supply<br>• Dust suppression<br>• Sand-blasting<br>• Stevedoring<br>• Cranes<br>• Equipment rental |

### 4.4.15 Optimization

Optimization strategies focus primarily on improving benefits for the provincial economy as a whole, and the provincial labour force and business, with particular attention to increasing employment and business benefits in the Study Area. The majority of effects on the economy, employment and business are positive, and the primary objective of any optimization strategies is to improve these benefits wherever possible.

In most cases, the proposed optimization strategies are an integral part of Project design and management planning, and reflect Vale Inco NL corporate policies. Many of them are extensions of initiatives already in use for the Argentia Demonstration Plant and, more generally, Vale Inco NL's mine/mill and administrative operations in Newfoundland and Labrador.

**Economy**

The main expression of Vale Inco NL's commitments to delivering economic benefits to Newfoundland and Labrador is its Industrial and Employment Benefits Agreement with the Government of Newfoundland and Labrador (VBNC and Inco Limited 2002). Under its major provisions, Vale Inco NL has committed to several strategies.

- **Provincial Offices:** Vale Inco NL will establish and maintain one or more offices in the province, manage the Project from these offices, and staff them with appropriately skilled individuals and with a staff complement appropriate to the nature of the Project.
- **Procurement Principles, Policies and Procedures:** Vale Inco NL will establish and implement procurement principles to improve opportunities for provincial benefits. Provincial suppliers will be provided full and fair opportunity and first consideration to participate on a competitive basis for the supply of goods and commercial services.
- **Supplier Development:** Vale Inco NL recognizes that the availability of a competitive and competent provincial supplier capability is a key element in the development and long-term success of the Project. Vale Inco NL will implement procedures and practices that will enhance this capability.
- **Provincial Construction Facilities:** Vale Inco NL recognizes the existence of significant construction, fabrication and assembly infrastructure within the province and will encourage its use. This includes requiring that potential bidders bid work on the basis of using competitive, qualified provincial suppliers of construction, fabrication and assembly services, where available.
- **Research and Development:** Vale Inco NL acknowledges that research and development and technology transfer are a basis for developing new technologies to support the growth of provincial industries. Technology transfer provides an opportunity for the transfer of skills from firms and workers outside the province to local firms and workers, which can lead to the development of a highly skilled workforce and industry sector within the province.
- **Employment and Training:** Vale Inco NL will implement an employment strategy that ensures residents of the province are given first consideration for employment and training, and will implement programs that allow for their orderly succession to increasingly higher levels of responsibility.
- **Engineering:** Vale Inco NL will ensure that management, engineering, procurement and service activities are carried out in the province to the greatest extent possible. This work will be undertaken by, or have the significant participation of, provincial suppliers.
- **Air and Marine Operations:** Vale Inco NL will require that the suppliers retained to ship nickel concentrate and finished products, and air transportation suppliers, have a base of operations in the province.
- **Reporting, Communications and Monitoring:** A number of reporting requirements to the Province are contained in the Industrial and Employment Benefits Agreement. (This is further discussed in Section 4.4.17).

**Employment**

Vale Inco NL will optimize the effects of the Project on employment. It will:

- Retain labour from local and national sources, to ensure that the construction schedule is met, while respecting commitments made under the Industrial and Employment Benefits

Agreement (IEBA) between Vale Inco NL and the Government and Newfoundland and Labrador;

- Establish a collective agreement with the Resource Development Council (RDC) that will see its member unions supplying skilled trades to construction contractors; this may include a commitment for construction contractors to employ qualified local people;
- Conduct job fairs in western Canada to attract former Newfoundland and Labrador residents back to the province to work on the Project;
- Continue to work with the Demonstration Project workforce with a view to transitioning many of them into Project positions;
- Develop a human resources plan in support of its commitment to women's employment in the IEBA;
- Work with governments, educational institutions, women's organizations and industry associations to advance gender diversity on the Project, including the establishment of targets for women's participation;
- Create a welcoming and respectful workplace, and adopt policies and initiatives that incorporate Vale Inco NL's commitment to People Values, in support of the employment and retention of women;
- Implement gender-based analysis for its own operations and those of its contractors to better understand issues that affect the advancement of women in the workplace;
- Provide competitive wages and benefits and a progressive work environment;
- Continue to collect résumés from residents interested in employment, and to support the use of the local area skills/qualifications database that is maintained by the Hydromet Participation Initiative (HPI), a multi-component program designed to identify and enhance participation of regional and provincial businesses in aspects of the Vale Inco NL Processing Plant and provide benefits to local non-profit organizations and residents.

During Project Decommissioning, Vale Inco NL will work with employees in advance of the scheduled facility Closure and offer programs to assist transition, including identifying employment and business opportunities at other CVRD Inco Limited facilities, and providing outplacement services, severance packages, and career counseling.

**Training**

Vale Inco NL will optimize the effects of the Project on training. It will:

- Maintain a work environment that provides employees with the opportunity to achieve their career goals, and provide the training and support they need to meet business objectives;
- Communicate with school staff and students about career options, participate in career fairs and support training efforts;
- Provide employment opportunities for students, and offer incentives to attract and retain students and graduates;
- Encourage employed journeypersons to participate in post-journeyperson training;

- Support the use of the HPI database, which identifies the market for skills required for the Project; and
- Support reasonable efforts designed to increase the number of women who have the skills required to support the Project, including support of post-secondary education institution initiatives designed to encourage the participation of women in science, trades and technology-based programs.

**Business**

Vale Inco NL will optimize the effects of the Project on businesses by:

- Continuing to support the use of the Hydromet Participation Initiative (HPI) to ensure businesses are prepared and qualified to pursue contracts, including the Bridging Strategy Support Program, which provides advice and financial assistance to local firms pursuing upcoming contracts and opportunities;
- Continuing to prepare a schedule that will identify specific goods and services required at specific stages during the Project with full and fair opportunity, and first consideration, for all goods and services to be supplied by qualified provincial suppliers, as indicated in the IEBA;
- Continuing to uphold corporate local benefits principles, including promoting use of local businesses, and working with business organizations and governments to develop local capabilities;
- Continuing to pre-qualify businesses for the supply of goods and services, maintain a website to facilitate the competitive pre-qualification process, and ensure that bids for contracts are sought through competitive tendering on a lump sum basis, with other options considered where they support business needs; and
- Ensuring that Project information is available throughout the province, outlining the contracting process and encouraging suppliers to express interest in business opportunities.

**Current Initiatives**

In anticipation of the Project, Vale Inco NL has, as previously noted, assisted in the establishment of a multi-component program, the Hydromet Participation Initiative (HPI), sponsored by ACOA, VBNC, the Government of Newfoundland and Labrador, Service Canada and the Argentia Area Chamber of Commerce (AACC). Four committees were established to oversee specific aspects of the HPI: Public Communications, Supply Opportunities, Capacity Development, and Skills Development Committees (AACC, 2006a).

The HPI has also developed a Bridging Strategy Support Program to offer advice and financial assistance to local businesses to enable them to pursue upcoming contracts and opportunities. Financial aid may be used to cover costs related to training, productivity/quality improvement, business consultant support, legal and other costs associated with forming a partnership or joint venture, marketing, and

supplier development; however, capital costs are not supplemented. Businesses may apply for up to 75 per cent of eligible costs (AACC, 2006b).

Training demands will be continuous throughout the life of the Project. This will have two effects on provincial training institutions: increased demands for higher levels of educational attainment to increase the number of apprentices and journeypersons in the work force, and increased demands on educational institutions to meet training needs (classroom sizes, program offerings).

This will increase enrolment in trades training courses at local and regional colleges. In anticipation, training institutions are developing strategies to increase capacity to meet short- and long-term demands. The Argentia Demonstration Plant development process has assisted in helping to determine the types of skills required; as a result of experience gained at the Plant, many workers are expected to transfer to the Project Site in Long Harbour, easing labour supply and training demands somewhat.

The ongoing need to maintain a skilled workforce will affect the enrolments and course offerings of secondary education and training institutions. Vale Inco NL has identified several specific pools from which candidates for the facility may be recruited for the Operations Phase (Table 4.19).

**Table 4.19 Potential Recruitment Pools for Operations Phase Workforce**

| Memorial University | College of the North Atlantic |
|---|---|
| **Faculty of Engineering:**<br>***Mechanical Engineering***<br>The Project requirements can be filled with students currently enrolled in this engineering discipline.<br>***Chemical Engineering***<br>There has been success in recruiting chemical engineers who are originally from the province. Continued effort should yield the requisite requirement.<br>***Electrical Engineering***<br>Recruitment should be successful provided long lead-time is allowed in the process.<br>***Process Engineering***<br>This cross-discipline program is being developed at Memorial University to address emerging industrial needs. Vale Inco NL anticipates that graduates from the program will readily find opportunities in the industry. | ***Process Operations Technology***<br>Discussions have been held with CNA to review the Company's requirements for process operators and technologists at the Argentia facility. CNA's program is configured to produce operators for the paper mills, the oil refinery, and the mineral processing operations in western Labrador.<br>***Diploma Courses***<br>Future opportunities may exist for the delivery of upgrading course[s] to fill in specific gaps for engineering technologists, laboratory technologists, and other similar technical skill sets. CNA's senior administrative and program development staff have assured their support in future short-course developments should these be required. |
| **Chemistry Department:**<br>Discussions with the faculty confirm that the B.Sc. chemistry major pool (i.e., net of post graduate candidates) has been steady at 8 to 10 persons annually. | |

Increasing the number of women involved in the Operations Phase is a challenge that requires encouragement, foresight and financial assistance. Vale Inco NL has surpassed gender diversity targets for the mine/mill operation in Labrador and at the Demonstration Plant at Argentia, where 38 per cent of the employees are women employed in non-traditional occupations, including engineering, process operations and lab analysis.

Vale Inco NL is committed to hiring, promoting, and encouraging participation by women in non-traditional occupations to help meet labour demands during the Operations Phase, and is working with external partners including governments, educational institutions, women's organizations and industry associations to meet labour and diversity targets.

### 4.4.16 Accidental Events

As discussed in Section 3.5, accidental events can lead to direct effects on the socio-economic environment or indirect effects as a result of damage to the biophysical environment. Particular concerns are associated with the effects on human health and safety, economic and recreational activities. Accidental events will have economic consequences if work at the Project is interrupted or other economic activities are affected. While some economic benefits may be generated for workers and companies involved in any clean-up activities, any disruption of Project or other activities is likely to have greater cost. The severity of effects from accidental events depends on, among other factors, the magnitude of the event, its location and, in some cases, time of year.

Specific events considered for this assessment were: an accidental release of hazardous materials into the marine environment (Long Harbour); an accidental release of hazardous materials to the surrounding terrestrial environment; and an accidental release of chlorine gas to the airshed surrounding it.

Every attempt will be made, through safety plans and preventive mechanisms, to avoid these accidental events, such that each of these potential events is likely to be extremely rare. The potential effects on the Economy, Employment and Business VEC are indicated in Table 4.20.

**Table 4.20 Accidental Events: Residual effects and Significance: Economy, Employment and Business VEC**

| Attribute | Economy | Employment | Business |
|---|---|---|---|
| **Direction** | Negative | Positive/Negative | Positive/Negative |
| **Magnitude** | Unknown | Unknown | Unknown |
| **Geographic Extent** | Provincial | Provincial | Provincial |
| **Duration** | Unknown | Unknown | Unknown |
| **Level of Confidence** | Low | Low | Low |
| **Certainty of Occurrence** | Low | Low | Low |
| **Significance** | **Significant Negative** | **Significant Negative** | **Significant Negative** |

If the accidental event is large enough to disrupt activity at the Project Site, there is a strong likelihood that the event will have a *Significant Negative* effect on the economy, employment and business. The nature, location and the scale of any such event are *unknown*, and hence its geographical extent and duration are *unknown.*

### 4.4.17 Residual Impacts and Significance

Table 4.21 summarizes the residual effects and their significance for the Economy, Employment and Business VEC.

**Table 4.21 Residual Effects and Significance: Economy, Employment and Business VEC: Summary for All Project Phases**

| Attribute | Economy | Employment | Business |
|---|---|---|---|
| **Direction** | Positive | Positive | Positive |
| **Magnitude** | High | High | High |
| **Geographic Extent** | Provincial | Provincial | Provincial |
| **Duration** | Long-term | Long-term | Long-term |
| **Level of Confidence** | High | High | High |
| **Certainty of Occurrence** | High | High | High |
| **Significance** | **Significant Positive** | **Significant Positive** | **Significant Positive** |

The residual effects of the Project will be *positive*, the benefits from it will be considerable for all elements of the economy and have a province-wide effect; a high level of confidence and certainty of occurrence is associated with this assessment. As discussed in Section 4.4.15, these positive effects will be further enhanced by the successful implementation of the optimization strategies outlined.

Some local businesses may be negatively affected if valued employees leave to take up positions with the Project, and some may be affected by wage inflation associated with labour supply shortages. In each case the employees themselves will benefit from higher incomes and perhaps greater job satisfaction, and the negative effects are expected to be minor and not significant compared to the overall positive benefits.

Some individuals who are unable to participate in these opportunities, and others who are on low or fixed incomes, may be adversely affected should local costs of living increase. This is, however, expected to be a minor concern as increased economic activity in the area should encourage more competition, which would have a moderating effect on prices.

Labour shortages, particularly during Construction, are expected to pose difficulties. The effect may be that a smaller percentage of Newfoundland and Labrador workers are employed on the Project than is anticipated; however, this will not negatively affect the overall economy, employment or income levels, as it assumes that the unavailability of local labour implies that those workers are fully employed elsewhere. Importing of non-local labour in a situation where all local labour is fully employed will, in fact, increase economic benefits locally and provincially.

### 4.4.18 Follow-up

Since 2003, VBNC has been providing the Government of Newfoundland and Labrador with a monthly report outlining the employment and industrial benefits that accrue to the Province. A Vale Inco NL benefits-monitoring system captures and compiles employment and contract award data, and reports them to the government. This reporting system will be extended to include the construction and operations of the Project. During Construction these data will be reported monthly, while during Operations they will be reported quarterly. Employment data are reported by residence (Newfoundland, Labrador, other), work location (Newfoundland, Labrador, other), gender, and category of employment (administration, technical, skilled trades). They are provided on all aspects of the Project, including the mine/mill, research and development, corporate services and engineering.

Expenditure data are provided for labour, supplies and equipment, transportation, taxes (HST, GST and PST), subcontracts (payments to various subcontractors), and other items (including overhead charges, insurance, supplier mark-ups, carrying charges, restocking costs and other charges).

The Province is also provided with information on contract and procurement awards, and on any major contracts/procurement activity being planned. The company normally meets with provincial officials on a quarterly basis to review and discuss any implications of this information.

## 4.5 Summary of Effects on Economy, Employment, and Business

The assessment indicates that the effects of the Project will be consistent with those of previous large industrial projects, in the Study Area and elsewhere in Newfoundland and Labrador, which have been shown to have had substantial positive economic effects on adjacent communities, the surrounding area and the province as a whole. These effects have included increased employment levels, business activity, government revenues, incomes and GDP. The Project will also contribute to the diversification of the provincial economy, as well as to education, training, and research and development.

The negative effects of earlier large industrial projects on the economies of adjacent communities, the surrounding area and Newfoundland and Labrador have generally been minor and of short duration. The above assessment indicates that the same will be the case with this Project, given its nature, the economic context and the optimization initiatives identified above. In summary, the effects of the Project on the Economy, Employment and Business VEC are expected to be *significant* and *positive*.

# 5.0 Services and Infrastructure

The following sections assess the effects of the Project on services and infrastructure in the areas of health, education, income support and employment services, security and safety, transportation, municipal services and infrastructure, industrial and commercial real estate, and housing.

## 5.1 Existing Conditions

This section provides a baseline description for the Study Area; where appropriate, some factors are described for the Region. Further information, including more detailed data-sets, is available in the Socio-Economic Component Study (JWL 2007a).

### 5.1.1 Health

Healthcare services and infrastructure are administered by the Eastern Health Authority (EHA), one of four such authorities responsible for healthcare in the province. It is responsible for all health services in the Region, including institutions and community health services.

**Healthcare Service Centres**

The EHA operates six facilities. The Carbonear General Hospital is the nearest hospital to the site and has 80 acute care beds. There are health centres in Old Perlican, Placentia and Whitbourne. There are two other facilities: the Placentia Health Clinic and the Dr. W.H. Newhook Community Health Centre in Whitbourne. The former is the only centre with acute care beds (10), Level II and III beds (75), and independent living units (40); the latter has three holding/observation beds (Eastern Health 2007a).

**Healthcare Professionals**

The EHA serves approximately 54,000 people, including over 12,000 people in the Study Area. In 2005-06 (year-end March 31) it employed 252 nurses (H. Hawkins, pers. comm.), equating to a nurse/population ratio of 1:215. There are 12 to 16 general physicians in the Study Area, equating to a physician/population ratio of between 1:1,021 and 1:766 (S. Jerrett, pers. comm.).

The nurse/population and physician/population ratios are not necessarily indicative of the level of health care service. People living within EHA boundaries do not solely receive health services from its institutions, and the population does not consume health care uniformly. Many people receive non-emergency health services in St. John's, and health care consumption is more closely related to demography than to total population, with the elderly and young children being disproportionately high health-care consumers.

The physicians most likely to be affected by any in-migration relating to the Project are general practitioners or family doctors. In addition to staff at the Placentia Health Clinic and D.W. Newhook

Community Health Centre, there are two family doctors in Whitbourne (J. Gosse, pers. comm.), two in Placentia (R. Power and F. Smith, pers. comm.) and one in Chapel Arm for three days a week (M. Pretty, pers. comm.). Several family doctors have relocated from Placentia to Bay Roberts and Carbonear in recent years. Patients in the Placentia-Long Harbour area have been generally known to continue with these physicians in their new locations, as they are still within a reasonable driving distance (M. Pretty, pers. comm.).

In 2007, an assessment was completed of the health needs of the Southern Avalon, which includes many of the communities in the Study Area (Eastern Health 2007b). The report indicates that residents of the Placentia area have concerns about physician turnover and the subsequent lack of continuity in care. A history of gaps in coverage of multiple salaried and locum physicians providing service at the Placentia Health Centre has forced some people to travel out of their area for general practitioner services. At the time of the needs assessment, a full complement of salaried physicians was in place at the Placentia Health Centre. Many residents who were consulted for the assessment reported being able to see their doctor by the next day, or within a week.

A nurse practitioner has been employed in a primary health care role at the Placentia Health Centre since January 2006. It is a temporary position associated with the Placentia Primary Health Care Renewal Initiative. The nurse practitioner works intensely with the collaborative practice model of diabetes care. She sees patients in the clinic at the Outpatients Department (1,028 appointments during the fiscal year to January 23, 2007), is the leader in the delivery of the cervical screening program in the area, has regularly scheduled Well Women Clinics in Placentia, St. Bride's and Whitbourne, and participates in Well Men and Well Teen Clinics and Rural Women's Health Days (Eastern Health 2007b).

Community health nursing services are also available at the Placentia Health Centre. Nurses have been identified as key people in providing service. For many people, the community health nurse is their first point of contact. People often turn to nurses to help navigate through the complexities of the health care system. They are regarded as very knowledgeable about needs in the community and as key links with other members of the health care team and Eastern Health partners (Eastern Health 2007b).

Mental health counselors working from Placentia cover clients from the east side of Placentia Bay and the Cape Shore. Residents have expressed concern that services to address mental health and addictions needs are not well known in Southern Avalon communities. There is also a perception that it is difficult to get an appointment with a counselor because of long wait times. Another issue identified was the difficulty general practitioners have in obtaining referrals to psychiatric service for their patients. Eastern Health has developed a strategy to improve mental health and addictions service in the region. Usage data for the mental health services offered from Placentia (full-time service) indicates that 17 new cases were opened in Placentia between April 2006 and February 2007. As of February 2007, there were 13 individuals waiting for service in Placentia, with an approximate wait time of two weeks. Clients are presenting with a variety of concerns, the most common of which are mood and anxiety disorders and various forms of abuse. Addictions service is available in Whitbourne with a bi-weekly clinic held in Placentia (Eastern Health 2007b).

There are two pharmacies in Placentia, one in Whitbourne and one in Chapel Arm. In Whitbourne there is one full-time dentist, one dentist who sees patients on a half-time basis, and the practice is taking new patients (J. Gosse, M Pretty and P. Pretty pers. comm.). Laboratory and X-ray services are also available at the Placentia Health Centre. Workload units at the Placentia Health Centre and D.W. Newhook Community Health Centre have declined for Lab/EKG operations (14 per cent) between 2002-03 and 2005-06 (Eastern Health 2007b).

### Community Services

The EHA offers many programs and services within the Study Area (Table 5.1).

**Table 5.1 Community Services and Programs, Study Area**

| Service/Program | Location Offered | Staffing |
|---|---|---|
| **Health Promotion and Protection** | Whitbourne | |
| **Community Health Nursing** | Placentia and Whitbourne | |
| **Mental Health Services** | Placentia and Whitbourne | Placentia: 0.5 mental health social worker<br>Whitbourne: One mental health nurse |
| **Addictions Services** | Whitbourne | Biweekly addictions counsellor<br>(from Harbour Grace clinic) |
| **Community Support Program** | | |
| **Child Care and Intervention Services:** | | |
| Community Behavioral Sciences Program | Whitbourne | |
| Child Care Services Program | Harbour Grace | |
| Direct Home Services Program | Whitbourne | |
| **Child, Youth and Family Services** | Placentia and Whitbourne | Placentia: Social workers<br>Whitbourne: Social workers, manager, and director of Child, Youth and Family Services and Community Corrections for Eastern Health and Community Services Board |

**Source:** Eastern Health and Community Services (EHCS) (2006).

### International Health

The EHA has a number of International Travel Clinics; however, none are held in the Study Area. In the Region, there are clinics in Harbour Grace, Holyrood, Bay Roberts, Clarenville and Bonavista. In addition, there are private travel clinics in St. John's (S. Porter, pers. comm.), where registered nurses provide travel health counseling, immunizations and disease testing (EHCS 2006; S. Porter, pers. comm.).

### Environmental Health

The provincial Environmental Health Program, administered by the EHA, seeks to reduce the risk of health hazards in the environment through collaboration with other agencies, communities, industry, and

government departments. It includes initiatives such as monitoring air quality, public water supplies, playground safety, food-borne pathogens and disaster planning.

Although the EHA is responsible for environmental health services, all field work is conducted by environment health officers with the Department of Government Services in Harbour Grace (Eastern Health 2007c). One environmental health officer is responsible for the Study Area, covering the area between Branch and Long Harbour-Mount Arlington Heights (Cape Shore). Three additional officers in the Harbour Grace office assist as necessary (S. Metcalfe, pers. comm.).

### Ambulance Services

Regional ambulance service is provided by five operators, who maintain 22 vehicles and receive ~6,540 calls per year (Table 5.2). Long Harbour and Whitbourne are serviced by Smith's, based in Whitbourne, with four ambulances and 16 personnel. Placentia is serviced by Power's, operating three ambulances with 13 personnel. Annually, these two operators respond to 600 calls each.

The annual number of calls reflects both emergency and routine calls (e.g., hospital transfers) for the operator's entire service area; data are not available by community. Each operator is required to ensure that if they are reduced to only one operating ambulance, it is reserved for emergency transport only. The only 24-hour service in the Region is the hospital-based service in Carbonear (M. Provencher, pers. comm.). A review of ambulance service for the entire Eastern Health region is being carried out by Eastern Health's Division of Paramedicine and Medical Transport. During the course of the Southern Avalon health needs assessment, the provincial government announced that it would engage an outside consultant to analyze medical transportation service (province-wide) provided to clients receiving income support (Eastern Health, 2007b).

### Table 5.2 Ambulance Services, Region

| Operator | Location | # Vehicles Maintained | Approximate Annual Call Volume | Approximate # Personnel |
|---|---|---|---|---|
| **Fewers** | Clarenville | 7 | 1,663 | 43 |
| **Smiths** | Whitbourne | 4 | 600 | 16 |
| **Moores** | Clarkes Beach | 3 | 3,200 | 41 |
| | Harbour Grace | 4 | | |
| **Powers** | Placentia | 3 | 600 | 13 |
| **Carbonear General Hospital** | Carbonear | 1 | 480 | 12 |
| | **Total** | **22** | **6,543** | **125** |

**Source:** M. Provencher, pers. comm.

The annual call volume has increased in recent years, with the elderly using ambulance services more frequently. During the fiscal year 2006-07, 55 per cent of all transports by private or community-based ambulance services were for patients 65 or older (M. Provencher, pers. comm.).

### 5.1.2 Education

The following sections describe the current educational services and infrastructure in the Study Area and, as appropriate, in the Region. Early childhood education, primary and secondary schooling, and post-secondary education are included. Information is provided on the types of post-secondary training available locally and indicates the ability of local schools to cope with in-migration.

#### Early Childhood Education

There is one registered early childhood education facility in the Study Area. Little Pete's Daycare, Placentia, with two staff members, has a capacity of 16 children at any one time (J. Sparks, pers. comm.). Currently there are 26 children registered, half for morning sessions and half for afternoon sessions. This daycare offers full-day care from 8 a.m. to 4:30 p.m. (M. Kelly, pers. comm.).

#### Primary and Secondary Schooling

There are nine primary and secondary schools in the Study Area. In 2005-06, there were 2,724 students enrolled in schools that had a physical capacity for an additional 1,210 students (Table 5.3). Placentia is scheduled for construction of a new high school to replace Laval High and a new elementary school to replace the existing schools in Dunville and Placentia (R. Power and F. Smith, pers. comm.). The student capacity of the planned buildings is not available.

**Table 5.3 Student Population and Capacity, Primary and Secondary Schools, Study Area, 2005-2006**

| School[1] | Location[1] | Grades[1] | Serviced Towns in Study Area[1] | Student Population 2005-06[2] | | |
|---|---|---|---|---|---|---|
| | | | | Registered 2005-06 | Capacity of School[1] | Special Needs Students |
| **Primary/Elementary Schools** | | | | | | |
| All Hallows Elementary *(stream into Amalgamated)* | North River | K-6 | • Roaches Line<br>• Mahers<br>• Makinsons | 456 | 500 | 42 |
| Holy Family Elementary *(stream into Crescent Collegiate)* | Chapel Arm | K-6 | • Bellevue<br>• Bellevue Beach<br>• Broad Cove<br>• Chance Cove<br>• Chapel Arm<br>• Fair Haven<br>• Long Cove<br>• Long Harbour-Mount Arlington Heights<br>• Norman's Cove<br>• Thornlea | 140 | 217 | 25 |
| St. Anne's *(stream into Laval)* | Dunville | K-9 | • Fox Harbour<br>• Placentia Junction | 251 | 614 | 40 |

| School[1] | Location[1] | Grades[1] | Serviced Towns in Study Area[1] | Student Population 2005-06[2] | | |
|---|---|---|---|---|---|---|
| | | | | Registered 2005-06 | Capacity of School[1] | Special Needs Students |
| St. Edwards Elementary *(stream into Laval High School)* | Placentia | K-8 | • Argentia<br>• Placentia<br>• Point Verde | 244 | 415 | 0 |
| Tricentia Academy | Arnold's Cove | K-12 | • Arnold's Cove<br>• Arnold's Cove Station<br>• Come By Chance<br>• Southern Harbour<br>• Sunnyside | 360 | 385 | 50 |
| Whitbourne Elementary *(stream into Crescent Collegiate)* | Whitbourne | K-6 | • Goulds Pond<br>• Markland<br>• Ocean Pond<br>• Whitbourne | 93 | 329 | 0 |
| Woodland Elementary *(stream into Crescent Collegiate)* | Dildo | K-6 | • Blaketown<br>• Dildo<br>• New Harbour<br>• Old Shop<br>• South Dildo | 215 | 358 | 4 |
| **Secondary Schools** | | | | | | |
| Crescent Collegiate | Blaketown | 7-12 | • Bellevue<br>• Bellevue Beach<br>• Blaketown<br>• Broad Cove<br>• Chance Cove<br>• Chapel Arm<br>• Dildo<br>• Fair Haven<br>• Goulds Pond<br>• Long Cove<br>• Long Harbour-Mount Arlington Heights<br>• Markland<br>• New Harbour<br>• Norman's Cove<br>• Ocean Pond<br>• Old Shop<br>• South Dildo<br>• Thornlea<br>• Whitbourne | 695 | 741 | 5 |
| Laval High School | Placentia | 9-12 | • Argentia<br>• Fox Harbour<br>• Placentia<br>• Placentia Junction<br>• Point Verde | 270 | 375 | 0 |
| | | | **Total** | **2,724** | **3,934** | **166** |

**Notes:** [1]M. Tucker pers. comm.
[2] Newfoundland and Labrador Statistics Agency/Community Accounts (2006).

The numbers of teachers and students in the Region have steadily decreased since the 1991-92 school year (Figure 5.1). The number of students declined 42 per cent from 20,370 in 1990-91 to 11,724 in 2004-05. The greatest change was in Zone 18, with a decline of 51.3 per cent over the same period. Student enrollment in Zones 15 and 17 fell by 47.8 per cent and 36.4 per cent respectively, suggesting that there is unused institutional capacity in the school system.

The number of teachers (measured in full-time equivalency) in the Region declined from 1,229.3 in 1990-91 to 838.9 in 2004-05, a decrease of 31.8 per cent; the greatest change occurred in Zone 18, which saw a decline of 40.6 per cent.

The number of students has declined more rapidly than the number of teachers in all three Zones. The student/teacher ratio has fallen from 15.8 in 1990-91 to 13.2 in 2004-05. The provincial ratio dropped from 15.4 to 13.9 over the same period (Figure 5.2).

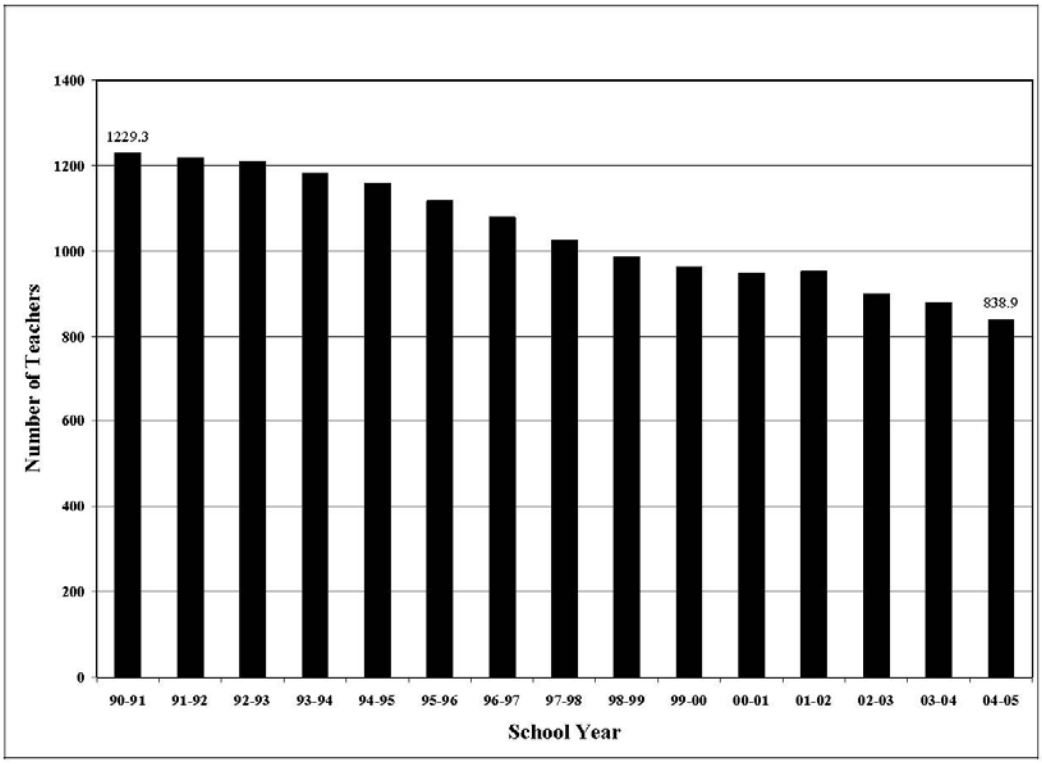


**Figure 5.1 Number of Students and Teachers, Region, 1990-91 to 2004-05**

**Source:** Newfoundland and Labrador Statistics Agency/Community Accounts (2006).

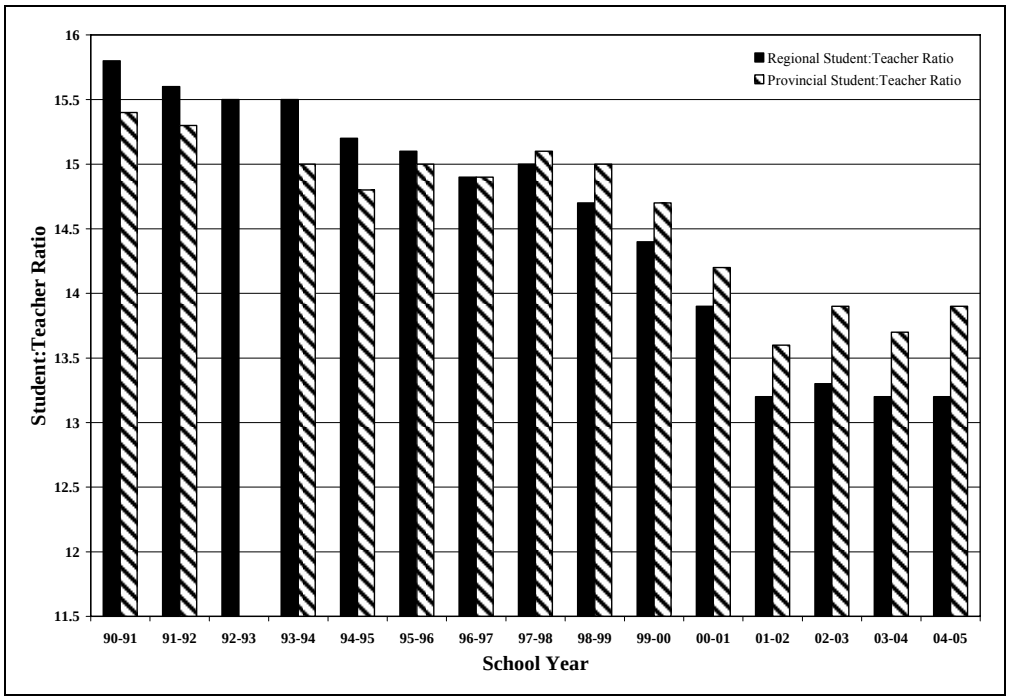


**Figure 5.2 Student/Teacher Ratio, Region, and Province, 1990-91 to 2004-05**

**Source:** Newfoundland and Labrador Statistics Agency/Community Accounts (2006).

## Post-Secondary Education

Newfoundland and Labrador has one university, Memorial University of Newfoundland (MUN), one public college, College of the North Atlantic (CNA), and 32 private training institutions (Department of Education 2006).

### *Memorial University of Newfoundland*

Memorial University of Newfoundland has four campuses: the main campus and the Marine Institute in St. John's, Sir Wilfred Grenfell College in Corner Brook and the Harlow Campus in England. Memorial does not operate a campus in the Study Area; however, its residents use all campuses, particularly those in St. John's. The St. John's main campus includes the faculties of Arts, Business, Education, Engineering, Medicine and Science, and the schools of Graduate Studies, Music, Nursing, Pharmacy, Human Kinetics and Recreation, and Social Work, plus several specialized centres.

Enrolment has increased from 16,483 in 1995 to 17,803 in 2005. The largest area of growth was in graduate studies, up from 1,366 to 2,295 over this period (Thorne, 2005). As of fall 2006 there were 17,509 students enrolled (Thorne and Hussey 2007). Memorial is a significant contributor to technological research and advancement in Atlantic Canada and has put in place programs to promote innovation in many industries, including mining and mineral processing.

### *College of the North Atlantic*

The College of the North Atlantic (CNA) is Newfoundland and Labrador's only public college. It has 17 campuses in the province, one of which is located in Placentia. This campus averaged 238 students per year between 2001 and 2006 (Table 5.4) and has traditionally served mature students (students coming from the workforce, not directly from secondary school) (T. Pittman, pers. comm.; D. Clarke, pers. comm.). The catchment area for the campus includes Economic Zone 18 (Figure 3.2) plus the Whitbourne-New Harbour area. The Industrial Trades programs offered at the campus includes students from all parts of the province (D. Clarke, pers. comm.).

In recent years the Placentia campus has expanded its market to include students leaving secondary schools inside and outside its immediate catchment area. In 2005-06, the average age of students was 27; 56 per cent were 25 years of age or younger. The campus serves mainly the area from Long Harbour-Mount Arlington Heights to Cape St. Mary's, but also those of Conception Bay, Trinity Bay, St. John's and the rest of the province with respect to Industrial Trades training (T. Pittman, pers. comm.). The full-time programs offered at the Placentia campus for the 2006-07 academic year are listed in Table 5.5, along with their capacity. All programs, with the exception of the newly offered Comprehensive Arts and Science (CAS) (College Transition) Program, are filled to capacity (D. Clarke, pers. comm.).

**Table 5.4 CNA Placentia Course and Program Enrollment, 2001-02 through 2005-06**

| Enrollment Status | 2001-02 | 2002-03 | 2003-04 | 2004-05 | 2005-06 | *Average* |
|---|---|---|---|---|---|---|
| **Full-Time** | 238 | 228 | 216 | 243 | 202 | ***225.4*** |
| **Part-Time** | 19 | 21 | 11 | 1 | 12 | ***12.8*** |
| **Total** | 257 | 249 | 227 | 244 | 214 | ***238.2*** |

**Note:** These figures include enrolment in non-program courses.
**Source:** T. Pittman, pers. comm.

**Table 5.5 CNA Placentia Program Offerings and Capacity, 2006-07**

| Program | Capacity |
|---|---|
| Adult Basic Education | 15 |
| Adult Basic Education – HRLE | 10 |
| Heavy Duty Equipment Technician | 17 |
| Machinist | 16 |
| Industrial Mechanic (Millwright) | 32 |
| Welder | 15 |
| Comprehensive Arts and Sciences (CAS) College Transition | 15 |

**Source:** T. Pittman, pers. comm.

### *Private Colleges*

Thirty-two private training institutions in Newfoundland and Labrador offer applied training in trades ranging from office assistance to equipment operation. There are no private colleges in the Study Area, but three in the Region: the Canadian Training Institute in Bay Roberts and Keyin College campuses in

Carbonear and Clarenville. The Canadian Training Institute offers training in heavy equipment operation, and Keyin College offers programs in business and applied arts, information technology, and healthcare and human services (Keyin College 2006).

### 5.1.3 Income Support and Employment Services

The following sections describe provincially and federally administered income support and employment services available in the Study Area and the Region.

**Human Resources, Labour and Employment**

The Newfoundland and Labrador Department of Human Resources, Labour and Employment, which provides income support, has one Career Employment and Youth Services Centre in the Study Area, in Placentia. It employs one client service officer who is responsible for the Cape Shore north to Clarenville, a service region that includes most of the Study Area.

There are two additional centres in the Region, located in Clarenville and Carbonear. Each has dedicated resources focused on helping clients prepare for, find and maintain employment. The available services are listed in Table 5.6. The main groups targeted for these services include youth, persons with disabilities, single parents and individuals with limited or no attachment to the labour market. Whitbourne, Southern Harbour, Chance Cove and Chapel Arm are served by the Carbonear Centre.

**Table 5.6 Services Offered at Career Employment and Youth Services Centres, Region**

| Individual Services | Organization Services | Business Services |
|---|---|---|
| • *Career Planning:* Career Counselling, Resume Writing, Interview Assistance<br>• *Financial Benefits:* Income Support benefits, income supplementation, employment supports, (e.g. tools), educational supports for person with a disability, LMAPD (labour market partnerships for persons with disabilities and funding for short term training)<br>• *Jobs:* Work search support through Job Broker services, wage subsidies (NL works).<br>• *Youth Services:* Graduate Employment, Student Employment Program and Student Works and Services Program (SWASP)<br>• *Labour Market Information:* 1-800-563-6600 or www.gov.nl.ca/nlwin<br>• *Information and referral:* to other fed./prov. and/or community based services | • *Partnerships Initiatives and funding.*<br><br>e.g., Genesis Employment Corporation or WISE (women in successful employment) | • *Human Resource Management:* Employer information forums, wage subsidies (NL Works) |

The Placentia office serves approximately 300 clients and sees only those who are not Employment Insurance (EI) eligible (i.e., have had no attachment to the workforce in the past three years) and those who are receiving EI and require supplemental income. The office serves provincial and federal income

assistance programs. A career development specialist is available in Harbour Grace and travels to the Placentia office as necessary (V. Smith, pers. comm.).

### Human Resources and Social Development Canada

The Region is served by three Service Canada Centres, operated by HRSDC, located in Placentia, Harbour Grace and Clarenville. Although there are service representatives in each, the majority of services can be set up and accessed by telephone or on-line (Service Canada, 2006). The services available to individuals, organizations and business are listed in Table 5.7.

**Table 5.7 Services Offered at HRSDC Centres, Region**

| Individual Services | Organization Services | Business Services |
|---|---|---|
| • *Career Planning:* Career counselling, resumé and interview assistance, student services<br>• *Financial Benefits:* Canada Pension, Disability Benefits, EI, Old Age Security, Survivor Benefits<br>• *Identification Cards:* Pleasure Craft Licensing<br>• *Jobs:* Job Bank, Work Search Tools/Tips, Youth Employment Services<br>• *Labour Market Information:* Job descriptions and links<br>• *Social Insurance Number (SIN) Application:* Residents and Immigrants<br>• *Training and Learning Services* | • Partnership initiatives and funding programs | • *Human Resource Management*: Hiring Foreign Workers, Record of Employment, Wage Subsidies<br>• *Labour Market Information* |

**Source:** Service Canada (2006).

In addition to the Service Canada Centres, HRSDC operates smaller offices offering specialized services, including the Employment Outreach and Career Information Resource Centre in Placentia and Employment Service Centres located in Clarenville, Bonavista, Chapel Arm and Bay Roberts. These offer similar services as the Service Canada Centres, but are targeted at local residents and youth (Service Canada 2006).

## 5.1.4 Policing and Safety

### Policing

Newfoundland and Labrador is policed primarily by B Division of the Royal Canadian Mounted Police (RCMP), with St. John's, Corner Brook and Labrador City being policed by the Royal Newfoundland Constabulary (RNC). The Study Area includes several districts within B Division: Placentia-Whitbourne District, Avalon East District, Trinity-Conception District, and Clarenville-Bonavista

District. The Placentia-Whitbourne District (the District) covers most of the Study Area and will be discussed in greater detail. The other RCMP districts have not been included in the discussion as they include only small portions of the Study Area.

Criminal offences are grouped into one of four categories according to the nature of the infraction: Criminal Code, Federal, Provincial and Municipal. Offences charged under the Criminal Code are typically the most serious, and those charged under Municipal the least. For example, provincial traffic violations include such infractions as speeding and dangerous driving, while Criminal Code traffic violations include offences such as impaired driving and driving without a license. Incidents of these offences are summarized in Table 5.8. In all years, the number of Federal and Municipal offences was much lower than other types of offences. Provincial offences were the most numerous.

**Table 5.8 Criminal Offences, Placentia-Whitbourne District, 2001 to 2005**

| Offence Type | 2001 | 2002 | 2003 | 2004 | 2005 | TOTAL |
|---|---|---|---|---|---|---|
| **Criminal Code offences[1]** | 1,105 | 1,093 | 1,036 | 1,005 | 703 | **4,942** |
| **Federal offences[2]** | 88 | 100 | 54 | 75 | 32 | **349** |
| **Provincial offences[3]** | 997 | 1,147 | 990 | 1,207 | 1,570 | **5,911** |
| **Municipal offences[4]** | 2 | 0 | 1 | 4 | 1 | **8** |
| **Collisions and Traffic offences[5]** | 400 | 341 | 330 | 278 | 238 | **1,587** |
| **Total Offences** | **2,592** | **2,681** | **2,411** | **2,569** | **2,544** | **12,797** |

**[1]Criminal Code Offences:**
Crimes Against Persons: Aggressive actions or threats that have targeted or injured a person. Criminal Code offences include Violations Causing Death, Attempting the Commission of a Capital Crime, Sexual Assaults, Assaults, Violations Resulting in the Deprivation of Freedom and other Violations involving Violence or the Threat of Violence.
Crimes Against Property: Criminal activity which causes damage to the property of a person or business. Criminal Code offences include Arson, Break and Enters, Theft, Possession of Stolen Goods, Fraud, and Mischief.
Other Criminal Code: All other Criminal Code activity (excluding Criminal Code Traffic offences). Offences include Prostitution, Gaming and Betting, Offensive Weapons, and Other Criminal Codes.
**[2]Federal Offences:**
Total Drugs: All criminal offences under the *Controlled Drugs and Substances Act*. Offences include Possession, Trafficking, Importation, and Production.
Total General: All criminal offences under federal statutes and the *Migratory Bird Conventions Act*.
Total Federal: Total General + Total Drugs
**[3]Provincial Offences:**
Total General: Criminal offences under provincial statutes excluding Traffic.
Total Liquor: All provincial statute criminal offences under the *Intoxicated Persons Detention Act* and the *Liquor Act*.
Total Provincial Traffic: Provincial statute criminal offences in the traffic category. Offences include but are not limited to: Fail/Stop/Remain Dangerous Driving, Drive Disqualified/Suspended, Other Moving Traffic, Other Non-Moving Traffic and Insurance Coverage Violation.
Total Provincial: Total General + Total Liquor + Total Provincial Traffic
**[4]Municipal Offences:**
Offences under municipal by-laws.
**[5]Collisions and Traffic Offences:**
Total Collisions: Includes fatalities, injury accidents, reportable damage and non-reportable damage of all motorized vehicle collisions.
Total Collisions: Offroad Vehicles: Off-road vehicle collisions only.
Total Provincial Traffic: Disputed provincial Traffic tickets.
Total Other Traffic: Municipal traffic offences and Checkstop Programs.
Criminal Code Traffic: Criminal Code traffic offences which include Dangerous Operation of a Motor Vehicle, Vessel or Aircraft, Dangerous Operation Evading Police, Impaired Operations/Related Violations and Other Criminal Code Violations.

**Note:** 2005 data represent only the period between January and September 2005.
**Source:** J. Taylor, pers. comm.

The number of Criminal Code offences committed in the District declined from 1,105 in 2001 to 1,005 in 2004. The number of Federal offences varied annually over the same period. The number of Provincial offences increased from 997 to 1,207; most of these offences were traffic-related, and these increased substantially, from 598 to 867, over that period. Municipal offences are so few (four in 2004) as to be negligible. There has been a decline in the number of vehicle collisions and criminal code traffic offences (see JWL 2007a).

The population served by the District fell from 15,142 in 2001 to 14,563 in 2004. The Criminal Code offences/population ratio decreased from 1:13.7 to 1:14.7 over this period. In 2004 there were 14 permanent front-line police officers (not including administrative positions or members of specialized units, such as Major Crime and Forensic Investigation) in the District. The police officer/population ratio increased from 1:1,082 in 2001 to 1:1,040 in 2004.

Highway traffic is policed by RCMP Traffic Services. This division is responsible for highway traffic offences, while traffic offences within towns are the responsibility of the local detachment offices. Twenty-seven members of this division are stationed at 10 locations across the province. In the Region, there are two members stationed in Clarenville and six in Holyrood. The number of traffic offences and collisions in the Division fell from 400 in 2001 to 278 in 2004 (J. Taylor, pers. comm.). Criminal Code offences in B Division have increased from 24,160 in 2001 to 27,261 in 2004, while Federal, Provincial, and Municipal offences have decreased, as have the number of collisions and traffic offences (J. Taylor, pers. comm.).

### Fire Protection

Within the Study Area, there are 13 municipal fire departments composed entirely of volunteers (W. Porter, pers. comm.). In addition, there is an industrial fire department at the North Atlantic Refinery in Come By Chance. Their staffing levels, equipment and average number of responses are summarized in Table 5.9. A new fire hall completed in Placentia in October 2007 replaced three existingones.

### Canadian Coast Guard and Search and Rescue

The Canadian Coast Guard (CCG) is responsible for providing resources in support of maritime search and rescue in areas of federal responsibility. The main CCG operation in Newfoundland is the Maritime Rescue Sub-Centre in St. John's, which responds to approximately 500 incidents involving 2,900 people per year. Of these incidents, 28 per cent are classified as distress incidents. The Newfoundland and Labrador region has more distress incidents than any other region in Canada.

Services outside the St. John's area are augmented by the Canadian Coast Guard Auxiliary (CCGA), a volunteer organization consisting of approximately 1,000 members and 460 vessels. The CCGA responds to 35 per cent of maritime search and rescue incidents (CCG 2006).

**Table 5.9 Fire Department Staffing, Equipment, and Fire/Emergency Responses, Study Area**

| Town/Company | # Volunteer Firefighters | Equipment | Approximate # Annual Responses | Information Source |
|---|---|---|---|---|
| Arnold's Cove | 32 | N/A | N/A | |
| Bellevue | N/A | N/A | N/A | |
| Chance Cove | N/A | N/A | N/A | |
| Come By Chance | 13 | • 10-year-old fire truck<br>• 10-year-old fire van<br>• Both in good condition | 1 or 2 | |
| Fair Haven | N/A | N/A | N/A | |
| Little Harbour East | N/A | N/A | N/A | |
| Long Harbour-Mount Arlington Heights | 13 | • 1981 GMC pump fire truck<br>• 1980 Chevrolet rescue van | | M. Pretty pers. comm. |
| Norman's Cove | 23 | • 1991 pumper truck<br>• 1973 water truck<br>• Supply van | 12 to 24 | D. Hudson pers. comm. |
| Placentia | 35 | • 3 pumper trucks<br>• 1 rescue van<br>• Jaws of Life<br>• Foam system | 26 | R. Power and F. Smith pers. comm. |
| Southern Harbour | 28 | • Pumper truck<br>• 1972 pick-up truck | 4 | |
| Sunnyside | 25 | • 1993 pumper truck<br>• 2003 rescue truck | 10 | |
| Whitbourne | 19 | • 1995 fire truck<br>• 2003 cube van<br>• 1972 pumper truck<br>• 1991 van<br>• Portable pumper<br>• Jaws of life | 30 | J. Gosse, pers. comm. |
| North Atlantic Refinery | Trained staff on each shift | • Foam wagon<br>• Hazmat<br>• 24-year-old fire truck<br>• 10-year-old fire truck | 15 to 20 | J. Beach pers. comm. |

**Note:** * N/A – Information was not available.

Ground Search and Rescue (SAR) in Newfoundland is typically coordinated by the RCMP, with the assistance of trained local volunteers. In the Study Area, ground SAR is provided by the Avalon North Wolverines Ground Search and Rescue team. This volunteer organization is based in Bay Roberts and has 55 trained members from the Bay Roberts area, Placentia, New Harbour and the north shore of Conception Bay. This is the largest of the 27 volunteer SAR teams in the province. Volunteers are trained and certified by the RCMP in map reading, compass use, first aid, CPR, night searches and other SAR techniques. Several volunteers are also trained in cold-water rescue (Town of Bay Roberts, 2007).

### 5.1.5 Transportation

The following sections describe the main modes of transportation within the Study Area, the Region and the province, including highways, airports, and marine ports.

#### Highways

The main provincially-maintained roads likely to be affected by Project-related traffic are Route 202 between the Trans Canada Highway (TCH) and Long Harbour, and Route 101 between the Argentia Access Road (Route 100) and Long Harbour. These are both single-lane highways and are in poor condition, requiring upgrading to bring them up to their potential capacity (J. Morrissey, pers. comm.).

According to the Newfoundland and Labrador Department of Transportation and Works (NLDTW), Route 202 and Route 101 are each theoretically capable of withstanding an increase of up to approximately 400 passenger cars per hour. However, Route 101 is in poor condition and would require upgrading to bring it up to its potential capacity (J. Morrissey, pers. comm.).

Average annual daily traffic data or average daily traffic volumes, manually collected during provincial traffic studies conducted by the NLDTW, are summarized in Table 5.10. Counts have not been conducted in recent years; therefore, historic data were increased annually by 2 per cent to provide estimates for 2006 traffic counts (J. Morrisey, pers. comm.). Based on this, NLDTW estimates that in 2006 approximately 490 vehicles per day exited the TCH and traveled towards Long Harbour on Route 202, and an additional 470 vehicles traveled towards Long Harbour on Route 101. The busiest highway in the area is the Argentia Access Road, which was estimated to have accommodated 1,684 vehicles per day in 2006.

**Table 5.10 Annual Average and Estimated Daily Traffic Counts, 1996, 2004 and 2006**

| Highway | Annual Average Daily Traffic Counts | | |
|---|---|---|---|
| | 1996 | 2004 | 2006 |
| **Route 202** *(Exiting TCH toward Long Harbour-Mount Arlington Heights)* | 405 | 474 | 493* |
| **Route 101** *(Exiting Route 100 towards Long Harbour-Mount Arlington Heights)* | 385 | 451* | 469* |
| **Route 100, Argentia Access Road** *(Exiting TCH towards Placentia and Argentia)* | 1,381 | 1,619 | 1,684* |

**Note:** *Estimated traffic counts based on 2% annual increase (J. Morrissey, pers. comm.).
**Source:** J. Morrissey, pers. comm.

### Ports

Two major harbours could be affected by increased industrial activity in the Study Area: the Port of Long Harbour and the Port of Argentia.

The Port of Long Harbour is managed by the Long Harbour Development Corporation. The finger-pier dock is 366 m long, with 12 m of draft alongside. The dock is constructed of concrete caissons with a concrete deck, allowing for substantial loading capacity. The well-sheltered dock can accommodate ships of up to 290 m. There are three berths: Berth 1 is 204 m long, Berth 2 is 198 m long, and Berth 3 is 168 m long (AACC 2003).

The Port of Argentia is owned by the Argentia Management Authority Inc. and administered by its wholly owned subsidiary, Argentia Port Corporation. It has three wharves: the Navy Dock, the Fleet Dock and the Marine Atlantic Terminal. The Marine Atlantic Terminal is equipped with a roll-on/roll-off ramp, but this is available, with consent from Marine Atlantic, only between October and May (AACC 2003; AMA 2006). The ferry provides passenger and vehicle service between Nova Scotia and Argentia from June to September. There were 80 annual crossings in 2005 and 2006, when the total number of passenger vehicles decreased by 3.9 per cent (Table 5.11) (NLDTCR 2007).

**Table 5.11 Marine Atlantic Passenger and Vehicle Traffic, Argentia to Nova Scotia Service, 2005 and 2006**

| | 2005 | 2006 | % Change |
|---|---|---|---|
| **# Passengers Carried** | 34,811 | 33,149 | -4.8 |
| **# Passenger-Related Vehicles Carried** | 13,617 | 13,092 | -3.9 |
| **# Annual Crossings** | 80 | 80 | 0 |

Source: NLDTCR (2007).

### Airports

There is no airport in the Study Area. The closest one is the St. John's International Airport (SJIA), 113 km from Long Harbour-Mount Arlington Heights (Newfoundland and Labrador Statistics Agency 2006).

Eighty per cent of non-resident visitors to Newfoundland and Labrador enter through SJIA. Passenger volumes increased 35 per cent from 2002 to 2005, and in 2005 the SJIA handled 1.2 million passengers. The St. John's International Airport Authority, which manages the airport, is projecting a further 20 per cent growth in passenger volumes over the next five years (SJIA 2005).

## 5.1.6 Municipal Government

There are three cities, 280 towns and 182 local service districts in Newfoundland and Labrador. The scope of municipal authority in Newfoundland and Labrador is defined by over a dozen pieces of provincial legislation including the *Municipalities Act 1999*, *Municipal Elections Act 2001*, *Urban and*

*Rural Planning Act 2000*, and *Water Resources Act 2002*. The following sections focus on the current state of municipal services and infrastructure within the towns most likely to be affected by the Project and in particular any in-migration that may result from it: Long Harbour-Mount Arlington Heights, Placentia, and Whitbourne. Municipal services and infrastructure addressed include personnel, roads, facilities, waste management, sewage, emergency planning and land use planning.

**Personnel**

The Town of Long Harbour-Mount Arlington Heights employs three full-time, paid personnel. The mayor and councillors are volunteers. The Town is examining staffing requirements to determine if current numbers are sufficient to deal with the potential increased workload resulting from the Project (M. Pretty, pers. comm.).

Whitbourne employs four people. The mayor and councillors are volunteers (J. Gosse, pers. comm.).

Placentia maintains the largest municipal staff in the Area, with 17 employees. The Town Office is reported to be very busy and short-staffed (R. Power and F. Smith, pers. comm.). Typically, when additional personnel are required, outside consultants are used instead of hiring directly. The mayor and councillors of Placentia are paid (R. Power and F. Smith, pers. comm.).

**Budgets**

The annual operating budget for 2007 for the Town of Long Harbour-Mount Arlington Heights is $302,032. Expenses (by service) and revenue sources are broken down in Table 5.12.

**Table 5.12 Town of Long Harbour-Mount Arlington Heights, Municipal Budget Revenues and Expenses, 2007.**

| Service | Breakdown ($) | Revenue Source | Breakdown ($) |
|---|---|---|---|
| General Government | 144,402 | Taxes collected for 2007 | 161,761 |
| Protective Services | 7,000 | Revenue from Town | 85,800 |
| Transportation Services | 44,405 | Municipal Operating Grants | 15,325 |
| Environmental Health | 31,137 | Province Portion of Debt Charges | 28,322 |
| Recreation and Cultural Services | 2,750 | Federal Government (Gas Tax) | 10,824 |
| Fiscal Services | 72,338 | Total | 302,032 |
| Total | 302,032 | | |

**Source:** M. Pretty, pers. comm.

The proposed operating budget for 2007 for the Town of Whitbourne is $976,457. Expenses (by service) and potential revenue sources are broken down in Table 5.13.

The annual operating budget for 2007 for the Town of Placentia is $3,529,495. Expenses (by service) and revenue sources are broken down in Table 5.14.

**Table 5.13 Town of Whitbourne, Proposed Budget Revenues and Expenses, 2007**

| Service | Breakdown ($) | Revenue Source | Breakdown ($) |
|---|---|---|---|
| General Government | 152,850 | *Proposed* tax revenue for 2007 | 575,922 |
| Fire Protection | 32,000 | Operating grant | 46,224 |
| Road Transportation | 220,000 | Other revenues | 213,727 |
| Environmental Health | 177,300 | *Proposed* capital works for 2007-08 | 140,584 |
| Planning and Development | 14,800 | *Proposed* Total | 976,457 |
| Recreation | 22,000 | | |
| Other | 215,142 | | |
| Total | 812,092 | | |
| **Source:** J. Gosse, pers. comm. | | | |

**Table 5.14 Town of Placentia, Proposed Budget Revenues and Expenses, 2007**

| Service | Breakdown ($) | Revenue Source | Breakdown ($) |
|---|---|---|---|
| General Government | 600,908 | Property tax | 1,016,520 |
| Protective Services | 112,600 | Business tax | 600,856 |
| Transportation | 613,732 | Poll tax | 12,600 |
| Environmental Health | 779,296 | Water and Sewer tax | 629,039 |
| Planning and Development | 170,370 | Water Tax only | 78,280 |
| Recreation and Culture | 219,008 | Payment in lieu of taxes | 70,000 |
| Fiscal Services | 1,033,581 | Grants in lieu | 30,400 |
| Total | 3,529,495 | Operating grant agenda | 50,000 |
| | | Recreation and cultural services | 7,000 |
| | | Arena revenue | 85,000 |
| | | Tipping fees | 2,400 |
| | | Licences and permits | 5,000 |
| | | Tax certificates | 2,000 |
| | | Miscellaneous income | 15,000 |
| | | Bank interest income | 3,500 |
| | | Municipal operating grant | 331,159 |
| | | Surplus from previous years | 440,741 |
| | | Sale of land | 50,000 |
| | | INCO Tax Agreement | 100,000 |
| | | Total | 3,529,495 |
| **Source:** R. Short, pers. comm. | | | |

## Roads

Most roads in Long Harbour-Mount Arlington Heights require repair. The main road through the town, Route 202, is maintained by NLDTW, and 3.5km of side roads are maintained and cleared of snow by the Town (M. Pretty, pers. comm.).

The roads in Placentia, which are jointly maintained by NLDTW and the Town, are also in poor condition (R. Power and F. Smith, pers. comm.). The Town is responsible for approximately 38 km of roads, and contracts a local company to provide snow-clearing services (R. Power, pers. comm.).

The roads in Whitbourne are in good condition. The Town services and provides snow-clearing for all municipal roads except for the main road (from the TCH to Markland) and Bond Road, both serviced by NLDTW. (J. Gosse, pers. comm.).

### Facilities

Facilities owned and maintained by Long Harbour-Mount Arlington Heights, Whitbourne and Placentia are summarized in Table 5.15.

**Table 5.15 Municipal Facilities, Long Harbour-Mount Arlington Heights, Whitbourne and Placentia**

| **Long Harbour-Mount Arlington Heights** (M. Pretty, pers. comm.) | **Whitbourne** (J. Gosse, pers. comm.) | **Placentia** (R. Power and F. Smith, pers. comm.) |
|---|---|---|
| • Town Council/Fire Department Building – includes the town council offices with an attached section for the fire department. The council office consists of one staff office and one council chamber, and contains various standard office equipment; and<br>• Tennis court, playground and ballfield.<br><br>Town infrastructure is under review. A change in the location of the Town Office is anticipated in the near future.<br><br>St. Francis Xavier Parish owns a Parish Hall located that is used for community functions. | • Town Hall;<br>• Fire Hall;<br>• Sports and Recreation Building;<br>• Library;<br>• Museum;<br>• Playground, soccer field, ballfield, skateboard park, and Historic Bond Park; and<br>• Sewage Treatment Facility. | • Town Hall;<br>• Fire Hall;<br>• Public Works Depot;<br>• Land Fill;<br>• Youth Centre;<br>• Arena, walking trails, regatta grounds and equipment, two ballfields and soccer field; and<br>• Planned: Sewage Treatment Facility in Dunville |

### Waste Management and Infrastructure

Each of the three towns has garbage pick-up every week. Long Harbour-Mount Arlington Heights pays an annual waste disposal fee to the Town of Norman's Cove to have its garbage transported to the Norman's Cove-Long Cove landfill (approximately 20 km) for disposal (M. Pretty, pers. comm.).

Garbage pick-up in Whitbourne and Placentia is contracted to BrownCo. Investment Inc., based in Placentia. Whitbourne uses the Norman's Cove-Long Cove landfill, while Placentia has its own municipal landfill off Fox Harbour Road (J. Gosse, pers. comm.; R. Power and F. Smith, pers. comm.).

### Provincial Waste Management Strategy

The Government of Newfoundland and Labrador has committed to advancing this strategy with full province-wide modern waste management implementation by 2020. The strategy establishes 15 waste management regions (Greater Avalon Regional Waste Management Committee, n.d.). By 2010, the landfills serving the Study Area will be closed and waste from the Area will go to St. John's. Until then, it is believed that the local landfills have the capacity to handle additional waste; if not, it will be moved to St. John's, which can easily accommodate additional waste, earlier than planned (D. Maddocks, pers. comm.).

### Sewage Management

The Town of Long Harbour-Mount Arlington Heights does not have a sewage system. Each building (home or business) has an individual septic system (M. Pretty, pers. comm.). Whitbourne uses a lagoon sewage-treatment system with lift stations where necessary (J. Gosse, pers. comm.).

Several different sewage systems are in use in Placentia. Most homes are attached to the sewer systems of the smaller communities that make up the Town of Placentia. All of these drain into adjacent fresh water. Those in Dunville and Freshwater use a gravity sewer system, while those in Placentia, Jerseyside and Southeast use septic tanks and a pump sewer system. The town has plans to build a sewage treatment plant in Dunville to service all of Placentia (R. Power and F. Smith, pers. comm.). Whitbourne operates a two-lagoon sewage treatment system consisting of one intake and one settling pond. These are aerated by three pumps and chlorinated (J. Gosse, pers. comm.).

### Emergency Planning and Response

All three towns have Emergency Planning and Response Plans (M. Pretty, pers. comm.; J. Gosse, pers. comm.; R. Power and F. Smith, pers. comm.).

### Land Use Planning

Long Harbour-Mount Arlington Heights is reviewing all land ownership, land use and zoning within the town boundaries for preparation of a Town Plan. This document is now in draft form and being reviewed by the Province (M. Pretty, pers. comm.).

Placentia and Whitbourne have Town Plans that include land zoned for new commercial and residential development (R. Power, pers. comm.; J. Gosse, pers. comm.).

### 5.1.7 Industrial and Commercial Real Estate

Large amounts of industrial and commercial space is available within the Study Area, and in Placentia and Argentia. As noted above, the Town of Long Harbour-Mount Arlington Heights has completed a Draft Town Plan that is now undergoing review. This document is expected to set aside large amounts of land for industrial and commercial use; however, the precise area and location has not been finalized (M. Pretty, pers. comm.).

Placentia has 21,838 $m^2$ of currently leased commercial (office/retail and warehouse) space. A further 11,608 $m^2$ (7,260 $m^2$ office/retail, 4,348 $m^2$ warehouse) is available at 16 sites within the town. Commercial-space prices range from \$130.00/$m^2$ to \$183.00/$m^2$ per month (AACC 2003). The Southside Industrial Park at Argentia has 40 fully-serviced lots ranging in size from 0.60 to 2.68 ha. Of 46,450 $m^2$ of building space, 27,870 $m^2$ is currently rented or leased. Of the 12 buildings located in the park, four are occupied, two are partially occupied, and six are vacant (AACC 2003). There is commercial space available for sale and/or lease in Placentia, where the demand is low for commercial real estate, as many businesses find it easier to operate from larger centres such as St. John's or Carbonear. (J. King, pers. comm.).

### 5.1.8 Housing

The following sections describe the current state of housing stock (for sale and for rent) and construction activity. Temporary accommodations (hotels and campgrounds) and residential land planning within the municipalities of Long Harbour-Mount Arlington Heights, Placentia and Whitbourne are described.

#### Housing Stock

The number of occupied private dwellings in the Study Area increased from 4,715 in 1991 to 4,925 in 1996. Between 1996 and 2001 the number decreased to 4,760, but then increased again to 4,888 by 2006. In 2001, 4,155 (87%) of these were owned and 630 (13%) rented (Statistics Canada, 2001). These are mostly single family units, with some duplexes and small apartment buildings in larger towns.

The 2001 average value of dwellings in the Study Area was \$51,694 (Statistics Canada, 2001). In recent years, housing prices and appraisals increased dramatically in the Placentia area when it was anticipated that the Project Site would be at Argentia; however, prices have since declined following the announcement that the processing plant will no longer be sited there (R. Power, F. Smith and J. King, pers. comm.).

Most of the housing in the Study Area is in Placentia, which has 1,620 occupied private dwellings, and Subdivision 1Y (Old Shop, South Dildo, Blaketown), which has 395 (Statistics Canada, 2001).

## Activity

The volume of residential sales and the number of units constructed in the Study Area is summarized in Table 5.16. From 2002 through June 2006, there were 40 housing starts in the Study Area. Long Harbour and Fox Harbour, which are combined for CMHC data presentation purposes, had the most starts (17). During the same period, there were 118 housing sales, with an average price of $41,185. Most sales occurred in Placentia-Argentia (63), followed by Whitbourne (17). Selling prices in the Study Area averaged $41,185 and ranged from an average of $88,333 in Blaketown to $8,000 in Southern Harbour (CMHC 2006).

**Table 5.16 Housing Construction Starts, Sales and Average Prices, Study Area, January 2002 to June 2006**

| Area/Town | Starts | Sales | Average Price ($) |
|---|---|---|---|
| Arnold's Cove | 16 | 2 | 30,000 |
| Chance Cove | 0 | 2 | 9,500 |
| Norman's Cove | 0 | 2 | 41,000 |
| Southern Harbour | 0 | 1 | 8,000 |
| Chapel Arm | 0 | 1 | 35,000 |
| Fairhaven | 0 | 2 | 37,250 |
| Bellevue | 0 | 10 | 40,375 |
| Sunnyside | 0 | 5 | 26,633 |
| Come By Chance | 0 | 2 | 52,000 |
| Whitbourne | 1 | 17 | 66,300 |
| Blaketown | 0 | 6 | 88,333 |
| South Dildo | 0 | 3 | 53,333 |
| Long Harbour - Fox Harbour | 17 | 2 | 27,800 |
| Placentia - Argentia | 6 | 63 | 61,068 |
| **Study Area Total** | **40** | **118** | |
| | | ***Average Selling Price*** | ***41,185*** |

**Source:** CMHC (2006).

Clarke's Real Estate, the only realty office in Placentia, has approximately 50 homes available for sale in the greater Placentia area, most of them in Placentia and Dunville, with only a small number located in Long Harbour-Mount Arlington Heights. A small number of the homes for sale are alternatively available for rent. Many of the older heritage and waterfront homes on the market have recently been bought by retirees and non-Canadians (J. King, pers. comm.).

The majority of rentals in the Placentia area are handled privately (J. King, pers. comm.). As of January 2006, approximately 65 apartment units and houses were available for rent in the greater Placentia area, with another approximately 35 likely to be available in the near future (R. Power, pers. comm.).

## Low-Income Housing

The Newfoundland and Labrador Housing Corporation provides low-income rental housing to households that cannot obtain suitable, affordable rental housing in the private market (Newfoundland

and Labrador Housing Corporation 2007). There are 50 low-income rental units in the Study Area, with the majority (49 units) located in Placentia. As of January 2007, six of these units were vacant.

### Residential Land Planning

Residential construction projects are planned and approved for the greater Placentia area and Whitbourne. Several residential lots have been approved for construction in Dunville, and a local developer has applied to the Placentia Town Council for further residential lots in Dunville (J. King, pers. comm.). A developer has recently completed a 40-lot residential subdivision in Whitbourne, and there is a concept plan for an additional 200 residential lots. The Whitbourne Municipal Plan allows for both residential and commercial land use within the town boundaries (J. Gosse, pers. comm.).

The Town of Long Harbour-Mount Arlington Heights is working to complete a Town Plan, which is expected to set aside land for residential development; however, the precise area and location has not yet been finalized (M. Pretty, pers. comm.).

### Temporary Housing

One hundred and twenty-three rooms are available at 18 hotels, bed-and-breakfasts and cottages in the Study Area (Table 5.17). Placentia has the greatest number of rooms (35) and the second largest hotel, the Harold Hotel (19 rooms). The largest hotel in the Study Area is the Tanker Inn (22 rooms) in Arnold's Cove. The only other large hotel in the Study Area is in the Moorland Hotel in Whitbourne (16 rooms). There are also 244 campsites for recreational vehicles and tenting, available during the tourist season (May to September). Most (114 campsites) are in Bellevue Beach (Table 5.18).

**Table 5.17 Temporary Housing, Study Area, 2006**

| Location | Hotel Name | # Rooms |
|---|---|---|
| Bellevue Beach | Fiddler's Green Resort | 9 cottages, 2 suites |
| Whitbourne | Pretty's Bed and Breakfast | 5 |
| | Moorland Hotel | 16 (1 Suite) |
| Bellevue | Connie's Housekeeping Units | 4 |
| Old Shop | House by the Bay | 2 room house |
| Placentia | Harold Hotel | 19 |
| | Dixon Inn | 3 |
| | Oceanview Efficiency Units | 4 |
| | LL & D Guest Rooms | 4 |
| | Rosedale Manor Bed and Breakfast | 5 |
| Dildo | The Ocean Breeze | 4 |
| | The Lookout Bed and Breakfast | 2 |
| | George House Heritage Bed and Breakfast | 4 |
| | Inn by the Bay | 6 |
| | Island View Efficiency Cottage | 1 cottage, 3 efficiency units |
| Come By Chance | Walwyn Inn | 3 |
| Sunnyside | Saltwater Joys Bed and Breakfast | 4 |
| Arnold's Cove | Tanker Inn | 22 |
| | **Total** | **123** |

**Source:** Newfoundland and Labrador Tourism (2006).

**Table 5.18 Camping Facilities, Study Area, 2006**

| Town | Campground | Serviced | Semi-Serviced | Un-Serviced | Notes |
|---|---|---|---|---|---|
| Bellevue | Bellevue Beach Park | - | 50 | 64 | Open from May 15 to September 24 |
| Chance Cove | Chance Cove Provincial Park | - | - | - | No designated campgrounds but camping is allowed |
| Arnold's Cove | Putt-N-Paddle Camp Grounds | - | 15 | 75 | Open from May to September |
| Makinsons | Droghedea R.V. Park | 40 | | | |
| Placentia | Fitzgerald Pond Park | 24 private campsites + 26 RV sites | | | |
| **Total Campsites** | | **284** | | | |

**Source:** Newfoundland and Labrador Tourism (2006).

## 5.2 Potential Interactions

The Project's main socio-economic effects will comprise:

- Direct effects of Project activity (e.g., employment and expenditures, transportation of materials, goods and personnel);
- Multiplier effects of Project activity (e.g., indirect and induced effects of employment and expenditures); and
- Project-related change that indirectly affects the demand for services and infrastructure, (e.g. the increase in demand for housing, health care, policing, etc., as a result of increased Project employment).

Socio-economic effects may be experienced differently by different social groups, and at different times by members of the same social group. For example, in the first case: While young people may welcome growth and change in a community, with increases in population and new services and infrastructure, these may be regarded as negative effects by the elderly. Similarly, while rental cost increases may benefit landlords, they will have a negative effect on tenants.

The three main causal factors of effects (employment, expenditures and transportation activity) are considered for each of the Services and Infrastructure VEC components (health, education, income support and employment services, policing and safety, transportation, municipal government, industrial/commercial real estate and housing). The potential interactions are indicated in Table 5.19.

Interaction reflects whether the Project, or related activities, will place any increased demands on the service or infrastructure in question, or whether these activities will result in an increase in the supply or quality of the service or infrastructure component. For example, construction will result in a temporary increase in employment in the Study Area that will place some increased demand on health services in the Region. During operations those demands may be rather different, given the likelihood of a larger permanent population, but will nonetheless be expected to increase demand on the system. No increase

in demand for services is expected during the Decommissioning Phase and hence no interaction is indicated.

**Table 5.19 Potential Interactions Matrix: Services and Infrastructure**

| Project Activities | Construction | Operation | Decommissioning | Accidental & Unplanned Events |
|---|---|---|---|---|
| **Employment** | | | | |
| Health | ✓ | ✓ | - | ✓ |
| Education | - | ✓ | - | - |
| Income Support and Employment Services | ✓ | ✓ | - | - |
| Policing and Safety | ✓ | ✓ | ✓ | ✓ |
| Transportation | ✓ | ✓ | - | - |
| Municipal Government | ✓ | ✓ | - | - |
| Industrial/Commercial Real Estate | ✓ | ✓ | - | - |
| Housing | ✓ | ✓ | - | - |
| **Expenditures** | | | | |
| Health | - | - | - | - |
| Education | - | - | - | - |
| Income Support and Employment Services | - | - | - | - |
| Policing and Safety | - | - | - | - |
| Transportation | ✓ | - | - | - |
| Municipal Government | ✓ | - | - | - |
| Industrial/Commercial Real Estate | ✓ | - | - | - |
| Housing | - | - | - | - |
| **Transportation** | | | | |
| Health | ✓ | ✓ | - | - |
| Education | - | - | - | - |
| Income Support and Employment Services | - | - | - | - |
| Policing and Safety | ✓ | ✓ | - | - |
| Transportation | n/a | n/a | n/a | n/a |
| Municipal Government | ✓ | ✓ | - | - |
| Industrial/Commercial Real Estate | - | - | - | - |
| Housing | - | - | - | - |

### 5.2.1 Issues and Concerns

There is concern that Construction Phase activity could result in an increased demand for services and infrastructure that will exceed the capacity of existing systems. For example, road transportation infrastructure could be affected by Project activities such as the shipment of construction materials and equipment, and from the presence and commuting of Project workers. The potential for the population of the Area to increase during construction (temporarily) and operations (long-term) will place greater demands on healthcare staff and infrastructure, policing, waste disposal and housing. New employment and increased affluence may also change the nature of demand for services and infrastructure.

These and other types of concerns were raised during stakeholder consultations (see Volume 1- The Project, Chapter 10) and are addressed in the following sections.

## 5.3 Existing Knowledge

There is considerable experience with the effects of large industrial projects on services and infrastructure in the province generally and within the Study Area particularly. In the 1960s the area saw the construction of the Long Harbour Phosphorus Reduction Plant, in the 1970s the Come By Chance oil refinery, and in the 1990s and the present decade the construction of the Hibernia production platform, fabrication and installation of the Terra Nova topsides, involvement in the Voisey's Bay mine/mill and White Rose projects, and construction and operation of the Voisey's Bay Demonstration Plant and the Newfoundland Transshipment Terminal. The social and economic effects of these large construction projects have been well-documented (Felt and Carter 1980; Legge 1983; Shrimpton and Storey, 1993, 2000, 2001; Jones 1998; Storey and Jones 2003) and have shown substantial positive economic effects on adjacent communities, the surrounding area and the province as a whole. Any negative effects on the social environment have generally been minor and of short duration.

A recurring theme, particularly in the more recent literature on these projects, is that with appropriate project design and planning many of the potential negative effects of large-scale projects can be avoided or mitigated, through government and corporate policies (e.g., benefits plans, employment equity and diversity plans), potential Project benefits can be realized and enhanced.

A second theme is that experience and familiarity with large-scale projects have had a significant effect on local expectations – specifically, that those expectations have become much more realistic than is often the case where construction is being experienced for the first time (Fuchs and Cake 1986). Where local experience is lacking, expectations (about the benefits that the Project will bring) and fears (about the negative consequences) are often unrealistically high. The reality is usually somewhere in the middle (Storey and Shrimpton 2000). Based on past experience, residents of the Study Area are more likely to be able to realistically assess the full range of social and economic costs and benefits.

In this context, it is notable that the Construction Phase of the Project is a little smaller than the Terra Nova and White Rose construction projects, and considerably smaller than the Hibernia construction project. While the Project will involve approximately 6,140 to 6,740 person-years of employment, this compares to about 5,800 person-years for Terra Nova and White Rose, and 20,250 person-years for Hibernia. Careful management of the impacts of each of these projects helped to reduce negative effects and increase benefits. There is no reason to believe that a similar process could not result in similar outcomes for this Project.

## 5.4 Services and Infrastructure Effects Assessment

While Project activities will have some direct effects on the Services and Infrastructure VEC, most such effects will result from demographic changes directly associated with employment and indirectly from income changes associated with Project-related employment. To illustrate the potential magnitude of effects, a series of demographic projections based on employment demand and supply is given below. Given the assumptions that need to be made about a number of unknowns, these projections should be

considered only as an attempt to establish an order of magnitude of demographic change, and hence demand, against which the capacities of various Services and Infrastructure systems can be evaluated. To emphasize the uncertainties associated with these estimates a range of values rather than a single value is given.

Construction will begin in Year 1 and continue until Year 4, with employment peaking at approximately 16,800 person-years in Year 5. It is difficult to forecast what proportion of the construction workforce will be drawn from the province generally and from the Study Area specifically. Labour market forecasts indicate likely shortages in many trades, so that it may be difficult for this or any other project to find the required skills in the province, let alone in the Study Area (see Section 4.4.13). Furthermore, much of the work will be undertaken by unionized labour, limiting the possibility for local preference.

The greater the number of construction workers employed from outside the Study Area, the greater the likelihood that the Service and Infrastructure system capacities will be exceeded. Because many construction tasks are relatively short-term, few non-local construction workers are expected to permanently relocate; however, even temporary relocation and the associated temporary demands on services and infrastructure has the potential for a boom – bust effect on local communities and to result in significant disruption to community well-being, adversely affecting the quality of life of residents and incoming workers alike.

To address this issue and avoid many of the potential problems of a large, short-term influx of construction workers, as well as to try to ensure that the Project will attract the necessary workforce, Vale Inco NL will build a high-quality accommodation complex for up to 500 workers. This will provide single room accommodations and extensive amenities. This management strategy, which is part of the Project design, will significantly reduce demands on local services and infrastructure. A similar strategy was adopted for the much larger Hibernia construction project and, while some local economic benefits were foregone, community disruption was largely avoided (Jones 1998; Storey and Jones 2003).

Project operations will directly employ about 400 workers. Some will be drawn from the existing Study Area labour force; some will commute on a daily basis from the wider Region or beyond. These workers and their families will place few, if any, additional demands on local services or infrastructure. However, some specialist workers will be hired from outside the region, and most likely from outside the province, and they and their families, and some other workers and their families who do not want a long commute, will relocate to the Study Area.

As part of its policy of providing local benefits, Vale Inco NL will hire locally whenever possible. Based on experience with the Argentia Demonstration Plant it is estimated that about 85 per cent of the operations workforce will be drawn from the Study Area and the Region with the remaining 15 per cent hired from elsewhere. Table 5.20 illustrates the projected demographic effects of direct employment during the Operations Phase for the Hydromet Plant under this assumption. Since the Hydromet Plant will generate, on average, approximately 410 direct jobs and 890 indirect and induced jobs versus the Matte Plant (Locke 2007), projections for the Hydromet Plant are used here, to illustrate the maximum

potential demographic change. Two additional scenarios were considered for comparative purposes, in which 20 per cent and 25 per cent of the workforce are assumed to be in-migrants.

**Table 5.20 Projected Demographic Effects of Direct Operations Employment under Different Local Hiring Assumptions, Hydromet Case**

| Workforce/Demographic Characteristics | In-migrants as a Percentage of the Direct Operations Workforce | | |
|---|---|---|---|
| | Low Impact (15%) | Medium Impact (20%) | High Impact (25%) |
| Direct workforce | 410 | 410 | 410 |
| In-migrant workers | 62 | 82 | 102 |
| Single/unattached workers* | 20 | 27 | 34 |
| Workers with families** | 113 | 148 | 184 |
| Total in –migrants | 133 | 175 | 218 |

**Notes:** * Assumes 33% of Newfoundland and Labrador workers are single/unattached (Statistics Canada, 2006).
** Assumes an average family size in Newfoundland of 2.7 (Statistics Canada, 2006).

In addition to those employed directly during the Operations Phase, others will be employed indirectly, providing inputs to operations, while yet others will find employment as people spend their incomes earned directly or indirectly from the Project (induced employment). Some of the induced employment will occur in the Study Area, but other indirect and induced employment will be generated in larger centres elsewhere in the province, particularly St. John's.

There is little theoretical or empirical basis for assumptions about how much of the indirect/induced employment will occur in the Study Area or how much of this employment will result in in-migration of workers. For the purpose of the assessment, it is assumed that 50 per cent of all indirect and induced employment will occur in the area and that 25 per cent of all employees will be in-migrants to the area. This is a high-end estimate as many local service companies, for example, may be able to accommodate increased sales without a proportionate increase in staff, but should this be necessary, companies may be able to hire locally. In addition, some of those families moving to the area will have more than one member working; this will have a dampening effect on the potential level of in-migration.

Table 5.21 provides the projected demographic effects based on the above assumptions. Two comparative scenarios illustrate the sensitivity of the assumptions: the "Low" projection assumes that 40 per cent of indirect/induced employment will be in the Study Area and that 20 per cent of those employees will be in-migrants. The "Medium" projection assumes 50 per cent and 20 per cent respectively.

Totaling the in-migration data from Table 5.20 and Table 5.21 provides a range for the potential number of in-migrants of 300 to 520, with the "most likely" outcome being in the order of 375 (Table 5.22).

It should be re-emphasized that these projections are designed to illustrate the likely order of magnitude of demographic change, i.e., the number of in-migrants is more likely to be 400 than 40 or 800. This order-of-magnitude estimate provides a basis for evaluating the capacities of existing services and infrastructure against this projected level of demand.

**Table 5.21 Projected Demographic Effects of Indirect and Induced Operations Employment under Different Local Hiring Assumptions, Hydromet Case**

| | High Impact | Medium Impact | Low Impact |
|---|---|---|---|
| Total indirect/induced employment | 890 | 890 | 890 |
| Study Area employment | 455 (50%) | 455 (50%) | 356 (40%) |
| Study Area in-migrant workers | 139 (25%) | 91 (20%) | 71 (20%) |
| Single/Unattached workers[1] | 46 | 30 | 23 |
| Workers and families[2] | 251 | 165 | 130 |
| Total in-migrants | 297 | 195 | 153 |

**Notes**: [1] Assumes 33% of Newfoundland and Labrador workers are single/unattached (Statistics Canada 2006).
[2] Assumes an average family size in Newfoundland of 2.7 (Statistics Canada 2006).

**Table 5.22 Projected Study Area In-migration by Scenario, Hydromet Case**

| | Scenario | | |
|---|---|---|---|
| | High Impact | Medium Impact | Low Impact |
| Total in-migrants | 515 | 370 | 286 |
| Adults | 402 | 289 | 219 |
| Children | 113 | 82 | 47 |
| Households | 241 | 173 | 133 |

Decommissioning will include removal, disposal, demolition, stabilization and monitoring activities to meet specific objectives of the proposed Rehabilitation and Closure Plan, detailed in Volume 1. There are no estimates on the number of workers required for Decommissioning and Closure, but the number is expected to be significantly less than during operations and will decline as work is completed. Monitoring activities will employ a small number of workers after Closure.

The effects on Services and Infrastructure during this Phase will be associated with reduced demand, and in the absence of any other economic activity, the result will be surplus capacity in the various systems.

### 5.4.1 Health

Construction workers will require health services to deal with accidents or illness. To meet the majority of these needs a first-aid clinic and health and emergency personnel will be available on-site and at the worker accommodations.

Vale Inco NL will ensure that Occupational Health and Safety and Emergency Response plans and procedures are in place and that a volunteer team of workers is trained and ready to respond an emergency. In addition, Vale Inco NL and its contractors will deliver safety training programs to all workers, including training in hazardous materials handling, fall protection, first aid and advanced first aid, self-contained breathing apparatus training, safe operations of person lifts and aerial platforms, and fire extinguisher training. These initiatives will help to reduce workplace and worker accommodations-related demand on local services, as will the fact that most of the workforce will be relatively young and in good health.

Other additional demands could result from commute or material and equipment transportation-related highway accidents, or from the in-migration of workers, possibly accompanied by family members, into the Study Area. As discussed below, transportation policies and practices and improved highway infrastructure will reduce the risk of accidents, and little Construction Phase-related in-migration to the area is anticipated. However, some construction workers may live in temporary accommodations, and as a group have the potential to place additional demands on health services and infrastructure.

While workers with serious health issues will be sent to hospitals in Placentia, Clarenville, Carbonear and St. John's, the labour force demographics and policies and practices listed above will limit the magnitude of any increase in demand. Furthermore, recent decreases in population may have led to some reduction in demand for existing health services and infrastructure outside St. John's. Should there be any demand for overseas workers, immigration authorities will examine their health status, including their vaccinations.

Operations Phase workers may also require health services. As in the case of construction, a wide range of standard practices will seek to prevent, and reduce the consequences of, accidents and ill-health. Health and safety-focused work practices will minimize workplace-related demand on local health services and infrastructure.

Some additional demands will result from the in-migration of workers and their families. As indicated above, the order of magnitude of the estimated number of in-migrants is about 375. This by itself might not warrant an additional general practitioner/family doctor in the Study Area, given the current physician/population ratio of between 1:1,021 and 1:766. The provincial average in 2005 was 1:518 (CIHI, 2007). Furthermore, the majority of the in-migrants will not be in the main demand categories for health services. At any rate, there is sufficient lead time to plan for any increased demand should this prove necessary.

During the Decommissioning and Post-Closure phases the workforce will shrink to near pre-Project levels and no additional or new demands are expected.

In each Phase the effects are potentially adverse insofar as some additional demands will be placed on the system. With appropriate management planning by Vale Inco NL and the regional health authority, the effects of any increase should be minor.

### 5.4.2 Education

The Construction phase is expected to generate little migration of workers and families and thus will have little effect on education services and infrastructure. Given the current capacity of the system, any increase that might be generated can be accommodated by existing services and infrastructure.

During the Operations Phase, some in-migrant families will have school-age children. Based on the upper-end projections given in Table 5.22, this would increase the enrolment in Study Area schools by

some 115 students, the majority at the primary or secondary level. Given recent population decline, all primary and secondary schools in the area have some excess capacity in terms of physical infrastructure. Depending on the ages and geographic distribution of in-migrant students, some additional teaching staff may be needed, but this increase should be accommodated through normal planning without significant difficulty.

Assuming that there is some out-migration during the Decommissioning Phase there will be a decrease in demand for education services and infrastructure, an increase in infrastructure capacity, and some increase in teacher/student ratios until readjustments occur through the normal school planning process.

### 5.4.3 Income Support and Employment Services

To the degree that construction work and its spin-off activities provide employment opportunities, reduce unemployment and raise income levels in the Study Area, the Region and the province generally, there should be some reduction in demand for these services. Given the anticipated high levels of demand for construction labour at the time of the Project, it is likely that those directly employed would otherwise have been working, with the result that there would be a negligible net direct effect on unemployment. Instead, it is likely that indirect and induced employment would be the main contributor to any benefits associated with reduction in demand for these services.

These types of positive benefits will continue and likely increase during the Operations Phase, as there will be a longer term and a broader range of direct, indirect and induced employment and income-earning opportunities, especially in the service sector, for those without specific trade skills.

During the Decommissioning Phase jobs will be lost, and without new employment opportunities there may be a return to pre-Project unemployment levels and demands for income support and employment services. Overall the Project will have a beneficial effect on services and infrastructure.

### 5.4.4 Policing and Safety

#### Policing

The presence of young, relatively well-paid construction workers in an area has long been associated with antisocial and criminal behaviour, including drunkenness, harassment and rowdiness. However, demographic change and increased professionalization has led to changes in the construction labour force, which now includes a larger proportion of older workers, often with families, and increasing numbers of women. These characteristics, together with extended work days, roster systems that allow workers to return home on a regular basis, and improved human resources practices, mean that nearby communities no longer need be adversely affected by a large construction project.

Communities in the vicinity of the Bull Arm site experienced very little antisocial and criminal behaviour associated with the Hibernia (Jones 1998; Storey *et al*. 1996), Terra Nova, White Rose,

Newfoundland Transshipment Terminal and the Voisey's Bay mine/mill construction project work-forces, and few such problems are expected with this Project. Security at the site and at the worker accommodations will reduce any demands on local policing.

The movement of Project construction materials and equipment, together with commuting construction workers, will increase highway traffic in the Study Area and increase the demands on police and other emergency services through traffic offences and accidents. However, the amount of commuting will be limited by the decision to provide accommodations for much of the labour force. These effects are discussed further under Transportation (Section 5.4.5).

During the Construction and Operations Phases there will be some increased demand on policing services but, as with previous projects in the Area, this increase is expected to be minor and can be addressed within the normal RCMP planning process. As discussed in Section 5.1.4, the area has seen a decline in population, and officer/population ratios increased in the 2001-04 period. If the 2001 ratios are considered acceptable, and if there has been no change in current staffing levels, then the District population could increase by another 588 persons before that ratio is again realized. This is well within the projected range of increases in Table 5.21.

**Fire Protection and Emergency Response**

Vale Inco NL will provide suitable fire protection and emergency response infrastructure and service to the Plant Site and the worker accommodations during the Construction Phase, and to the Plant Site during the Operations and Decommissioning Phases. Emergency equipment and personnel might be made available to the community of Long Harbour-Mount Arlington Heights if needed. Finding volunteers for most community activities in rural Newfoundland and Labrador, including fire protection and emergency response, has become increasingly difficult in recent years as people have left. An increase in the population of the Area could provide a new source of recruits for this and other volunteer activities. During the Decommissioning Phase, all other things being equal, a return to pre-Project activity levels is expected.

### 5.4.5 Transportation

Construction materials and equipment will arrive by road and sea, while personnel will commute by bus between their accommodations and the Project Site, or by car.

Table 5.23 provides an estimate of construction-related highway traffic, including commuters and deliveries of heavy construction materials such as steel and concrete. It indicates increases of total traffic volumes that vary from 15 per cent in Year 1 to a peak of 32 per cent in Year 3. As discussed in Section 5.1.5, Routes 202 and 101 are single-lane highways in poor condition and require upgrading to bring them up to the standards required for the Project. If these roads are upgraded and maintained to "E" category standards (see Section 5.1.5), they would have a capacity in the order of 400 passenger cars/hour.

**Table 5.23 Estimated Traffic on Routes 202 and 101 during Construction (Vehicles per Day[1])**

| Year | Commuter Vehicles | Concrete Trucks | Structural Steel Trucks | General Freight Trucks | Total for the Project[2] | Current Traffic Count[3] | Total, Current and Project |
|---|---|---|---|---|---|---|---|
| Year 1 | 83[4] | 8.8 | 0.6 | 0.4 | 93 | 1,001 | 1,094 |
| Year 2 | 400 | 8.8 | 1.8 | 1.3 | 413 | 1,021 | 1,434 |
| Year 3 | 470 | 7.6 | 0 | 3.3 | 482 | 1,040 | 1,522 |
| Year 4++ | 198[5] | 0 | 0 | 0.7 | 199 | 1,062 | 1,261 |

**Notes:**
[1]Vehicles per day assumes a schedule of 330 working days per year, excepted where noted.
[2] Estimated to nearest whole number.
[3] Estimated based on two per cent annual increase.
[4] Only last quarter (90 days) of year 1.
[5] Average commuter vehicles per day declines from 230 at beginning of year 4 to 150 by Project completion.
+ Construction is expected to commence in year 1.
++ Construction is expected to conclude in year 4.

During construction, workers will most likely be on 12-hour shifts, 7 a.m. and 7 p.m., with peak traffic approximately 30 minutes before and after each shift. The upgraded road system will have sufficient capacity to meet projected needs. In order to reduce congestion associated with shift changes, Vale Inco NL will schedule freight deliveries to avoid these time periods. Furthermore, all site entrances and exits will be designed so that site traffic can merge safely with other traffic; vehicles making deliveries will follow established routes, and oversized loads will have police escorts.

Up to three vessels per month, either barges or ships, will deliver construction materials to the site, resulting in a minor increase in the amount of vessel traffic in Placentia Bay. All vessels will operate in compliance with the Placentia Bay Routing System and Canadian shipping regulations. There may also be a very minor increase in air passenger volumes at the St. John's International Airport, associated with movements of managers, and specialist company and contractor personnel. None of these increases is expected to have significant effects on the system capacities, although the marine vessel movements will contribute to the cumulative growth of traffic in Placentia Bay.

During the Operations Phase the majority of transportation to and from the plant will be by road and can be divided into three categories: shift traffic, internal traffic and materials delivery/product shipment. Between 100 and 150 vehicles will move on and off the site every 12 hours associated with the shift changes, contractors and visitors. To reduce congestion, Vale Inco NL will continue to schedule freight deliveries to avoid shift changes. It is assumed that highway Routes 202 and 101 will have been upgraded prior to the Construction Phase to a standard that would meet these demands.

Bulk materials, including concentrate and reagents, will be delivered to the site by ship. It is expected that up to 25 ships per year would be required. All vessels will operate in compliance with the Placentia Bay Routing System and Canadian shipping regulations.

During Decommissioning, materials and equipment would be removed from the site by water and road; this is not expected to place any additional or new types of demand on any of the transportation systems in the Study Area.

### 5.4.6 Municipal Government

Municipal governments are officially responsible for water and sewer services, street lighting, road maintenance, waste management, fire and police services, public transportation, public libraries, recreation facilities, and promotion of economic development (Newfoundland and Labrador Federation of Municipalities, 2005). Construction activities will place only minor demands on these services and infrastructure.

Temporary facilities for water and sewer services will be provided at the Project Site, with potable water delivered and distributed to key points around the Site as construction evolves. All temporary sewage disposal systems will comply with applicable health and safety regulations. Local municipal sewer systems will not be used and septic waste will be transported offsite by pump trucks and disposed in an approved site by a licensed waste disposal operator.

The worker accommodations will have their own water and sewage-disposal systems. Domestic solid waste, i.e., waste generated at the Site and the accommodations, will be collected, properly stored, removed and disposed of in a government-approved landfill in the Study Area. These arrangements will have some effects on local municipal governments, which will be compensated by payment of user fees and taxes. The worker accommodations unit will also have its own recreation facilities.

As discussed elsewhere, it is expected that there will be little in-migration of workers with families during the Construction Phase, given the relatively short-term nature of the work and the availability of accommodations. There will be few demands for residential services and infrastructure in communities in the Study Area. Workers who choose to relocate will likely occupy existing accommodations, and place no demands on municipal services that cannot be met through existing capacity.

The main effects on municipal services and infrastructure will occur during the Operations Phase. Under the assumptions made in Section 5.4 (Table 5.22), the number of new households (single persons and families) is estimated to range between 135 and 250 units. The implications for these increases are discussed below, but demands on municipal services and infrastructure will be minimal, in part because the Study Area has experienced population decline in recent years and any in-migration can be accommodated by existing services and infrastructure.

While local services and infrastructure may not be significantly affected, the number of personnel required to manage municipal affairs in some communities may be insufficient to meet demand. The issue has been raised in Long Harbour-Mount Arlington Heights and in Placentia and, if necessary, will have to be addressed before Project start-up. A benefit from the Project is that in-migrants will contribute to the tax base and hence offset the cost of those services and infrastructure.

In the absence of any alternative development to the Project, Decommissioning will reduce demands on municipal services and infrastructure to current levels.

### 5.4.7 Industrial and Commercial Real Estate

Contractors, sub-contractors, suppliers and commercial business operators could require office, warehousing, or commercial space away from the Project Site. As noted in Section 5.1.7, large amounts of such space are available in the Study Area, or could be made available in the short term. The Town Plan for Long Harbour-Mount Arlington Heights, currently in review, is also anticipated to make provision for new industrial and commercial land requirements. Thus there will be no adverse effects, and any increase in demand for space will be positive, insofar as it will be associated with increased local employment and municipal tax revenues.

In the absence of alternative developments, Decommissioning will result in a return to the current situation in which there is excess infrastructure capacity. This Phase will place no new demands on industrial or commercial real estate.

### 5.4.8 Housing

Little in-migration of workers with families is expected during the Construction Phase. On-site accommodations will house up to 500 workers from outside the Study Area, and others will have access to rental or temporary accommodations. Although there are no temporary accommodations in Long Harbour-Mount Arlington Heights, over 100 hotel rooms are available in the Study Area, including 35 in Placentia. Few, if any, adverse effects on housing are expected during the Construction Phase, and owners and operators of rental units and temporary accommodations will benefit from increased demand.

One concern expressed about the Construction Phase was the possibility of workers living in campers in unregulated gravel pits. There are no prohibitions against such camping on Crown Land. Vale Inco NL has no legal means of preventing it through terms of employment of workers. However, the Department of Transportation and Works can remove any vehicles, including campers, which obstruct general road maintenance or interfere with public safety.

The presence of high-quality Project accommodations will be a disincentive for construction workers to camp in gravel pits. In addition, Vale Inco NL will liaise with its contractors and cooperate with provincial authorities in seeking to discourage such camping. Within communities, Vale Inco NL will support the RCMP in enforcing controls on illegal camping and squatting.

As indicated in Section 5.4 (Table 5.22), during the Operations Phase the number of new households (single persons and families) is estimated to range between 135 and 250 units. Greater affluence may also result in demand for new houses and for upgrades and renovations of existing units.

Local contractors will benefit from opportunities for new construction, upgrades and renovations, but in terms of housing for in-migrants there is more than sufficient capacity to meet anticipated demand. In 2006, the Study Area contained 1,783 vacant dwelling units and had a vacancy rate of 26.7 per cent. As such, any Project-related demographic change will be beneficial for the local housing market.

Temporary accommodations will be required in all Project phases by business travelers and short-term contract workers. Should current capacity not meet future needs, private sector companies are expected to respond to the opportunity.

Decommissioning, in the absence of any alternative economic opportunities, will once again see out-migration and a return to high vacancy rates.

### 5.4.9 Optimization

Optimization, in the context of socio-economic effects, refers to the prevention or mitigation of adverse effects and the creation or enhancement of beneficial ones. Anticipation of potential effects, careful management planning, and follow-up to identify unexpected outcomes and evaluate the effectiveness of the optimization strategies all can significantly contribute to the reduction of negative effects and enhancement of positive ones.

Not all of the optimization strategies are within the mandate of Vale Inco NL to implement. Vale Inco NL will work with organizations and agencies that provide services and infrastructure in the Study Area and the Region to try to ensure that optimization strategies are developed and implemented.

Optimization strategies are suggested for service and infrastructure components affected by the Project during any phase, i.e., effects that cannot be accommodated within the existing system and where a response is required.

#### Health

Vale Inco NL will work with the adjacent communities to develop a response plan that will share resources in the event of a major incident in the community or at the site. Vale Inco NL will also provide relevant Project information to responsible authorities to assist in their planning for the Study Area. Other required changes in health care personnel and infrastructure will be managed through the normal planning process of the Eastern Health Authority.

#### Policing and Safety

Vale Inco NL will consult with the RCMP and other organizations responsible for safety to ensure that Project activities are clearly understood, that associated risks can be assessed and evaluated, and appropriate actions taken. No specific optimization measures beyond normal management planning processes are expected to be necessary.

## Transportation

Vale Inco NL is working with the Government of Newfoundland and Labrador to ensure that specific highways in the Study Area are upgraded to meet traffic demands.

A short section of Route 202 linking the TCH and Long Harbour-Mount Arlington Heights should be widened 7m, including two driving lanes and gravel shoulders with ditches. There should be similar improvements to Route 101, which links Long Harbour-Mount Arlington Heights and the Argentia Access Road. Given the anticipated traffic levels on these roads, the NLDTW will need to increase the current level of maintenance ('B' on Route 101 and 'C' on Route 202) to ensure the upgrades are maintained.

To reduce traffic movements of personnel, Vale Inco NL will provide bus transportation between the worker accommodations and the Project Site, and will encourage and assist its Operations Phase workers to use bus transportation and car pooling.

## Municipal Government

As part of its long-term planning, Vale Inco NL is negotiating a comprehensive tax agreement with the Town of Long Harbour-Mount Arlington Heights. Vale Inco NL will also work with local stakeholders to better understand and address the needs of communities near the site.

The development and review of town plans, including human resource requirements, will assist in anticipating municipal services and infrastructure needs of the local population and for economic growth. A plan for the Town of Long Harbour-Mount Arlington Heights is under review and other communities in the Study Area have identified issues that may have to be addressed in advance of the Project.

As discussed earlier, in-migrants will contribute to the local tax base and thereby defray the cost of local services. This might benefit communities such as Dunville (new sewage treatment facility), and Placentia (need for additional staff), and others proposing to upgrade municipal services and infrastructure.

## Housing

Labour shortages, at the national level particularly for skilled trades workers, are anticipated during the Construction phase. It is expected that workers will need to be recruited from outside the province and that Vale Inco NL and its contractors will need to offer an inclusive benefits package to attract workers and ensure an uninterrupted supply. To this end, and as a means of reducing adverse effects from the influx of a large temporary construction work force, Vale Inco NL will provide housing in a purpose-built construction accommodations complex.

Where appropriate, specific arrangements will be made for female workers at the site, e.g., scheduled workout-room times for women only. The accommodations complex will be off-limits to the public, with access controlled by security. Residents will be discouraged from leaving the accommodations site unless special circumstances warrant. Alcohol, drugs and firearms will be subjected to a zero-tolerance policy.

Shortly following the completion of construction, the accommodations complex and associated support facilities will be removed and the site restored to its original condition.

### 5.4.10 Accidental Events

As discussed in Section 3.5, accidental events can lead directly to effects on the socio-economic environment or, indirectly, as a result of damage to the biophysical environment; of particular concern is the effect on human health and safety and economic and recreational activities. The severity of effects from accidental events depends on, among other factors, the magnitude of the event, its location and, in some cases, the time of year.

Specific types of accidental events considered for this assessment are:

- Accidental release of hazardous materials into the marine environment (Long Harbour);
- Accidental release of hazardous materials from the plant to the surrounding terrestrial environment; and
- Accidental release of chlorine gas from the plant to the airshed surrounding it.

Every attempt will be made to avoid these accidental events, making each of these potential events extremely rare. The potential effects on each of the Services and Infrastructure VEC components are discussed below.

#### Health Care

Any of the above events could adversely affect individual health and, therefore, have an effect on healthcare services and infrastructure, but in the event of a chlorine gas release, there could be immediate or short-term health effects to local residents and workers that would have to be addressed by local and regional health services. Workers could be injured in the accident or during clean-up activities. Depending on the severity of any incident, Study Area health care and emergency medical services would be used.

#### Education

There should be no direct effect on education in the Study Area. If people have to be evacuated from adjacent communities for an extended period, students may need to attend other schools; however, this

would be a short-term adjustment within the capacity of the Study Area education system to accommodate.

**Income Support and Employment Services**

Accidental events could affect income support and employment services if the accident prevents Project employees from working, through either Closure or disability.

**Policing and Safety**

The effect on policing and safety would be to increase demands on personnel and infrastructure, as a result of the need to coordinate and implement emergency response measures. These resources could be redeployed from other responsibilities elsewhere in the Study Area.

**Transportation**

The effects on transportation services and infrastructure could include increased system demands if there were a need to evacuate workers and local residents, and/or road Closures.

**Municipal Services and Infrastructure**

In the event of serious accidents of the type described, municipalities would likely be involved through the use of municipal equipment and buildings, if the implementation of emergency response measures and evacuation proved necessary.

**Industrial and Commercial Real Estate**

An accidental event could result in an increased need for industrial and commercial real estate in the Study Area. It may be necessary to bring in clean-up equipment and crews to address a serious spill, and there may be a need for warehousing, office space or lay-down sites.

Accidental events could have indirect consequences for industrial or commercial real estate if some businesses were forced to close, the additional effects being loss of employment and income.

**Housing**

There could be some take-up of temporary accommodations if it became necessary to bring clean-up crews into the Study Area.

Table 5.24 summarizes the significance of these potential accidental events on each of the Services and Infrastructure VEC components. Where a residual effect has the potential to be significant (negative), appropriate mitigation measures would be applied, including implementation of the Vale Inco NL

Emergency Response Plan and, as appropriate, the coordinated application of related community/institutional plans. In some cases it will be appropriate to contract for resources (e.g., heavy equipment, buildings, transportation services) in a manner that avoids overtaxing area services and infrastructure.

**Table 5.24 Accidental Events Residual Effects and Significance - Services and Infrastructure VEC**

| Attribute | Health | Education | Income Support | Policing and Safety | Transportation | Municipal Government | Industrial/ Commercial Real Estate | Housing |
|---|---|---|---|---|---|---|---|---|
| **Direction** | Negative | Neutral | Neutral | Negative | Negative | Negative | Negative | Neutral |
| **Magnitude** | Unknown | Negligible | Negligible | Unknown | Unknown | Unknown | Unknown | Unknown |
| **Geographic Extent** | Local | Local | Local | Local | Local | Local | Local | Local |
| **Duration** | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown | Unknown |
| **Level of Confidence** | Low | High | High | Low | Low | Low | Low | Low |
| **Certainty of Occurrence** | Low | Low | Low | Low | Low | Low | Low | Low |
| **Significance** | **Significant Negative** | **Not Significant** | **Not Significant** | **Significant Negative** | **Significant Negative** | **Significant Negative** | **Significant Negative** | **Not Significant** |

### 5.4.11 Residual Effects and Significance

Residual effects are those Project outcomes that remain after appropriate design characteristics have been incorporated and optimization strategies implemented. Residual socio-economic effects may be adverse or beneficial to groups and individuals affected by the Project.

The significance of the residual effects for the Project is evaluated according to the criteria outlined in Section 3.4, Table 3.1 and Table 3.2. The findings are summarized for each of the Services and Infrastructure VEC components in Table 5.25.

As Table 5.25 indicates, the majority of residual effects are judged to be *positive significant* - i.e., the Project will result in an overall increase in beneficial effects at any geographic scale. For example, the Project is expected to have beneficial effects on housing as in-migrants take up vacant properties and improve them, particularly during the Operations Phase.

The residual effects on health and policing, safety services and infrastructure are considered to be *not significant.* In both cases an increase in the population will place more demands on each of these systems so effects are considered negative. However, these demands can be accommodated through reorganization in the use of existing resources without requiring major changes to system capacity.

**Table 5.25 Residual Effects and Significance: Services and Infrastructure VEC - Summary for All Project Phases**

| Attribute | Health | Education | Income Support | Policing and Safety | Transportation | Municipal Government | Industrial/ Commercial Real Estate | Housing |
|---|---|---|---|---|---|---|---|---|
| **Direction** | Negative | Positive | Positive | Negative | Positive | Positive | Positive | Positive |
| **Magnitude** | Medium | Negligible | Negligible | Medium | Medium | Medium | Medium | Medium |
| **Geographic Extent** | Regional | Local | Regional | Regional | Local | Local | Local | Local |
| **Duration** | Long-term | Long-term | Long-term | Long-term | Long-term | Long-term | Long-term | Long-term |
| **Level of Confidence** | Medium | High | High | High | High | High | High | High |
| **Certainty of Occurrence** | Medium | High | Medium | High | High | Medium | High | High |
| **Significance** | **Not Significant** | **Significant Positive** | **Significant Positive** | **Not Significant** | **Significant Positive** | **Significant Positive** | **Significant Positive** | **Significant Positive** |

### 5.4.12 Follow-up

As discussed in Section 3.6, follow-up in the socio-economic context is designed to confirm effects predictions and to establish the effectiveness of optimization measures implemented. It involves monitoring the socio-economic effects of the Project, the evaluation of data against established criteria, and the recommendation of actions to address any concerns that may arise.

The process of effects predictions provides a basis for the development of appropriate and focused monitoring programs that could be implemented in each of the Project phases. In many cases, the data collected in support of the socio-economic assessment will provide a baseline for subsequent evaluation of the Project's socio-economic effects.

Follow-up of any effects on the Services and Infrastructure VEC components is normally the responsibility of government generally, and the agency or organization with the mandate for the delivery of the service in particular. Vale Inco NL will assist this by providing relevant plans and information, by co-operating to address any important unanticipated effects, and in the review of any management strategies implemented to optimize Project outcomes.

## 5.5 Summary of Effects on Services and Infrastructure

As has been noted above, there is considerable experience with the effects of large industrial projects on services and infrastructure in eastern Newfoundland generally and within the Study Area in particular. In this context, it is notable that the Construction Phase will involve approximately 5,570 (Hydromet) or 4,950 (Matte) person-years of employment, compared to about 5,800 person-years for the Terra Nova

and White Rose construction projects, and 20,250 person-years for Hibernia. Careful management of the impacts of each of these earlier projects was successful in reducing any negative effects and increasing benefits. The above assessment indicates that the same will be the case with the Project Construction Phase effects on services and infrastructure, especially given the provision of worker accommodations.

The Operations Phase of this and other projects are potentially less challenging for services and infrastructure, given the lead time for preparation and the longer duration of any effects, which means that there is no boom-and-bust and that systems can adjust or be adjusted in advance. Operations Phase effects will, for the most part, be beneficial to the Study Area as existing capacity is more fully utilized and local government revenues increased (e.g., housing, education, and industrial and commercial real estate), where infrastructure is improved (e.g., transportation) or demand is reduced (e.g., income support). For those VEC components for which increases in demand could have adverse effects (e.g. health and policing), it is anticipated that increased demands can be accommodated whether through the use of existing capacity or through a redeployment of capacity from within the larger regional systems.

In summary, the effects of the Project on the Service and Infrastructure VEC is expected to be *not significant* in the case of the Health and Policing and Safety components, and *significant* and *positive* for all other VEC components.

# 6.0 Recreational Activities

The following sub-sections describe recreational activities in the Study Area and the Region. This includes hunting, angling, berry-picking, boating, hiking, and tourism attractions.

## 6.1 Existing Conditions

This section provides a baseline description of existing recreational activities in the Study Area and the Region. While activity characteristics are complex and make categorization difficult without overlap, for the purposes of this assessment activities are categorized into three main groups: recreation and natural resource use (e.g., hunting and fishing); recreational leisure activities (e.g., boating and organized sports); and natural, cultural and historic tourism attractions. Further information, including more detailed data-sets, is available in the Socio-Economic Component Study (JWL 2007a).

### 6.1.1 Recreational Natural Resource Use

#### Hunting

Hunting includes both large game (moose, caribou and black bear) and small game (ptarmigan and snowshoe hare). Grouse, while considered small game, is not hunted.

For large game, hunting license applicants are pooled and names of recipients are drawn by computer. Applicants state their preference for hunting areas, and efforts are made to ensure that hunters receive a license for an area near their community of residence, if requested (W. Barney, pers. comm.). The hunting season for moose and caribou is between September and December. Licenses for the Island typically limit retention to a single animal. Licenses issued and changes from the 2004-05 hunting season in the Study Area are summarized in Table 6.1.

Black Bear Management Areas are geographically the same as Moose Management Areas and are open annually between May and July. No black bear hunting is permitted within the Region; however, it is permitted near Swift Current (Black River, Area 28). There were 126 licenses issued for the 2006-07 hunting season. These licenses have a limit of two bears of either sex (NLDEC, 2006b).

**Table 6.1 Large Game Hunting Licenses Issued, Region**

| Species | # of Licenses Issues for 2006 Season | Change in # of Licenses Issued from 2004-05 Season |
|---|---|---|
| **Moose** | 1,600 | + 100 |
| **Caribou** | 225 | 0 |
| **Black bear** | 126* | 0 |

**Source:** NLDEC (2006b).
*W. Barney, pers. comm.

This is a popular hunting area for ptarmigan and hare; however, the numbers of hunters could not be quantified, as small game licenses permit hunting in all open areas (W. Barney, pers. comm.).

## Angling

The Study Area includes rivers from Salmon Fishing Area (SFA) 10 (all those rivers emptying into Placentia Bay and St. Mary's Bay) and SFA 6 (all those rivers emptying into Trinity Bay). Salmon stocks are managed by DFO through issuing licenses to anglers, classifying rivers and restricting the catch limit.

In 2004, 15,657 salmon fishing licenses were sold (N. Cochrane, pers. comm.) for use in any part of the province. There are four salmon rivers in the Study Area: Bellevue River, Northeast River (Placentia), Southeast River (Placentia) and tributaries, and Great Barasway River. They are all Class Three rivers, meaning that an angler may catch a maximum of two fish per day (catch and release), and retain a maximum of two fish per year (DFO, 2006a). Salmon fishing activity in the Study Area is summarized in Table 6.2.

**Table 6.2 Number of Rods and Salmon Caught, Released and Retained, by Salmon Fishing Area and Salmon Rivers in the Study Area in 2005**

| SFA/River | Approximate # of Rods | Approximate # of Fish Caught |
|---|---|---|
| **SFA 6** | **343** | **16** |
| Bellevue River | 23 | 2 |
| **SFA 10** | **3,942** | **1,003** |
| Northeast River (Placentia) | 448 | 122 |
| Southeast River (Placentia) + tributaries | 1,041 | 143 |
| Great Barasway | 8 | 2 |
| **Source:** DFO (2006a). | | |

Residents of Newfoundland and Labrador do not require a license to fish for trout (DFO, 2006a), and trouting has one of the highest resident participation rates in Canada (R. Buchanan, pers. comm.). Residents of the Study Area also engage in recreational marine angling, pursuing mackerel, smelt and groundfish (cod) (M. Pretty, pers comm.). Residents taking part in the recreational groundfish fishery require a license issued by DFO, and such activity is permitted only during specified summer and fall months, with a limit of five fish per person per day. In 2007 the season ran from July 25 to August 19 and September 29 to October 7 (DFO 2007).

## Berry-Picking

Berry-picking is a common activity in late summer and early fall throughout the province. Residents of the greater Placentia area usually pick along both sides of the Long Harbour Road turn-off, near Fitzgerald's Pond Park, and on the Backlands near Argentia (R. Power and F. Smith, pers. comm.). Residents of Whitbourne pick berries along the old rail bed and near the neighbouring community of Markland (J. Gosse, pers. comm.).

## Domestic Wood Harvesting

Domestic wood harvesting permits for the Study Area are issued by the Department of Natural Resources offices at Paddy's Pond (St. John's) and Whitbourne. Annual permits for Sub-management Unit H in Management Unit 1 (The Avalon Peninsula) are distributed in fall. Applicants in Unit H are granted a three-month permit and allowed to cut a maximum 11 $m^3$ of wood (five cords) in the area specified on their permit. During the period from 2002 to 2007, 137 permits were issued per year for Unit H (Table 6.3).

**Table 6.3 Domestic Wood Harvesting Permits Issued Annually, Sub-management Unit H (Western Cape Shore), 2002 to 2007**

| Domestic Harvesting Area | Local Name | Average Number of Permits per Year (2002 to 2007) |
|---|---|---|
| H-0 | Roadside cutting throughout Unit H | 4 |
| H-1D | Long Harbour | 1 |
| H-2D | Seven Islands | 2 |
| H-3D | Ship Harbour | 10 |
| H-4D | Ship Harbour Brook | 7 |
| H-5D | Rattling Brook | 9 |
| H-6D | Villa Marie | 20 |
| H-7D | Argentia Access | 12 |
| H-8D | Northeast Arm | 7 |
| H-9D | Southeast Placentia | 20 |
| H-10D | Point Verde | 6 |
| H-11D | Little Barasway | 0 (1 permit issued between 2002 and 2007) |
| H-12D | Great Barasway | 4 |
| H-13D | Cuslett | 27 |
| H-14D | Gooseberry Cove | 3 |
| H-15D | Patrick's Cove | 3 |
| H-16D | St. Brides | 2 |
| | **Total** | **137** |

**Source:** B. Tucker, pers. comm.

## Cabins

There are 1,150 licensed remote cabins (188) and cottages (962) in the Region. Remote cabin owners are not required to conduct a survey of their land, but must re-apply for a license every five years. Cottage owners on Crown Land must pay for a survey; however, once a permit is issued they own the land as a freehold. Permits are issued by Crown Lands, a division of NLDEC (J. Freake, pers. comm.).

Most cottages are found in the Ocean Pond area. Other popular locations are Bellevue, Western Gull Pond and Whitbourne. Owners of these cabins are from all parts of the Avalon Peninsula (J. Freake, pers. comm.).

There is no database of illegal remote cabins on Crown Land. When illegal cabins are identified by Lands Management Officers, owners are given a notice to apply for a remote cabin permit. If they do not apply or if the application is refused, the cabin is scheduled for removal (J. Freake, pers. comm.).

### 6.1.2 Recreational Leisure Activities

#### Boating

Recreational boating opportunities abound in the communities near the Project Site. Two companies offer sea kayaking tours and rentals in Placentia. The Town of Placentia also owns and operates several rowing shells and holds an annual Regatta, drawing teams from St. John's, Harbour Grace and Corner Brook. Wharves in Dunville, Jerseyside and Placentia offer berths to recreational sail- and power-boats (R. Power and F. Smith, pers. comm.).

#### Hiking

Eight hiking trails in the Study Area are listed in the Newfoundland Tourism Guide (Newfoundland and Labrador Tourism 2006) (Table 6.4), none of them in the immediate area of the Project. These are used by residents and tourists alike for walking, cycling, cross-country skiing and snow-shoeing.

**Table 6.4 Hiking Trails in the Study Area**

| Trail Name | Location |
|---|---|
| Bordeaux Walking Trail | Arnold's Cove |
| Ocean View Walking Trail | Norman's Cove - Long Cove |
| Green Mountain Walking Trail | Norman's Cove - Long Cove |
| The Argentia Backland Trail | Argentia |
| Centre Hill Trail | Sunnyside |
| Crout's Way Hiking Trail | Makinsons |
| Castle Hill Hiking Trail | Placentia |
| Town of Placentia Trail | Placentia |

**Source:** Newfoundland and Labrador Tourism (2006).

In addition to the listed trails, residents of Placentia and Whitbourne often use the old rail-bed as a walking trail (R. Power and F. Short, pers. comm.; J. Gosse, pers. comm.). Residents of Whitbourne and tourists also use the Wetlands Conservation Walking Trail, located off the rail-bed, and the Sir Robert Bond Park Trail (J. Gosse, pers. comm.).

#### Sport

Recreation facilities owned and maintained by Long Harbour-Mount Arlington Heights, Placentia and Whitbourne are listed in Table 6.5. The Unity PARC Arena at Placentia is a large multi-purpose sports complex with indoor facilities for hockey, skating and curling. Most communities in the Study Area

have ball-fields and soccer fields. The ball-field in Dunville was built to national standards and regularly hosts provincial tournaments (R. Power and F. Smith, pers. comm.).

**Table 6.5 Recreation Facilities, Long Harbour-Mount Arlington Heights, Whitbourne and Placentia**

| **Long Harbour-Mount Arlington Heights** (M. Pretty, pers. comm.) | **Whitbourne** (J. Gosse, pers. comm.) | **Placentia** (R. Power and F. Smith, pers. comm.) |
|---|---|---|
| • Tennis court<br>• Playground<br>• Ball-field | • Playground<br>• Soccer field<br>• Ball-field<br>• Skateboard park<br>• Historic Bond Park<br>• Trinity Placentia Stadium | • Arena<br>• Walking trails<br>• Regatta grounds and equipment<br>• Two ball-fields<br>• Soccer field<br>• Tennis courts |

Vale Inco NL has donated funds to the Town of Placentia for upgrading of the outdoor lighting at the Dunville ball-field and for construction of recreation facilities at the new high school (NLDNR, 2006).

### 6.1.3 Natural, Cultural, and Historic Tourism Attractions

#### Parks

There are two Provincial Park Reserves, one Provincial Park and one Natural and Scenic Attraction in the Study Area, in addition to two private parks.

Fitzgerald's Pond Provincial Park Reserve, located 15 km from Dunville, is a conservation site for protection of the boreal felt lichen and public use is not permitted (NLDEC, 2006c). There are two additional Provincial Park Reserves in the Region: Jack's Pond and Bellevue Beach (NLDEC, 2006c).

Chance Cove Provincial Park permits camping in its parking lot and picnic area and provides pit toilets and drinking water. Gooseberry Cove Provincial Park (south of Placentia) permits day use between June and September (NLDEC, 2006c).

Cataracts Provincial Park, southeast of Placentia, is a Natural and Scenic Attraction Provincial Park. The main attraction is a deep river gorge with two waterfalls, attracting photographers. It is available for day use only (NLDEC, 2006c).

There are two Ecological Reserves, so designated because of the large colonies of internationally important seabirds: Cape St. Mary's Ecological Reserve and Baccalieu Island Ecological Reserve (NLDEC, 2006c). In addition to the ecological reserves there is Rocky River Salmon Ladder and Holding Pool in Colinet, with a salmon ladder and visitor interpretation centre (Newfoundland and Labrador Tourism, 2006).

There are two private parks in the Study Area: Bellevue Beach Park, a trailer park with serviced and unserviced lots, cabins for rent, swimming, and a playground; and Fitzgerald Pond Park, with campgrounds and RV facilities (Newfoundland and Labrador Tourism, 2006).

There is also a history of indiscriminate and uncontrolled camping in gravel pits and other sites along highways in all areas of the province. Only very limited anecdotal information is available on the scope and scale of such activity.

### Cultural and Historic Attractions

There is one National Historic Site in the Study Area: Castle Hill, located near Placentia, which was the French capital of Newfoundland. It is open from May through October (Parks Canada, 2006). There are also several museums, archaeological sites and historic buildings in the Study Area (Table 6.6).

**Table 6.6 Cultural and Historic Attractions, Study Area, 2006**

| Attraction | Location | Open Season |
|---|---|---|
| **Museums** | | |
| Whitbourne Heritage Museum | Whitbourne | July 1-Labour Day |
| Railroaders' Memorial | Whitbourne | All Year |
| South Dildo Whaling and Sealing Museum | South Dildo | |
| The O'Rielly House Museum | Placentia | |
| The International Museum of the Atlantic Allies | Argentia | |
| Drogheda Historical Farmhouse | Makinsons | May-Sept. |
| Sunnyside Museum | Sunnyside | Summer |
| **Archaeological Sites** | | |
| Blaketown Beothuk Site | Blaketown | July 1-Aug. 31 |
| Placentia Uncovered Archaeology Project | Placentia | June-September |
| Dildo Island Dorset Site | Dildo | June 1-Sept. 30 |

**Source:** Newfoundland and Labrador Tourism (2006).

### Historic Resources

In 2006, VBNC retained Gerald Penney and Associates to conduct archaeological surveys of the Project Area and immediate vicinity (GPAL, 2006). The immediate Long Harbour area was surveyed to ascertain potential for the presence of historic resources. While Placentia Bay was frequented by all three pre-contact cultures of Newfoundland (Maritime Archaic, Palaeoeskimo, and Recent Indian), archaeological knowledge of this bay cannot be described as definitive. Surveyed in 1970 for the National Museums of Canada, the bay is otherwise "in the middle of an extensive area of southeastern Newfoundland that is virtually unknown archaeologically" (Linnamae 1971:1). The National Museum survey located 10 pre-contact sites, with three exhibiting archaeological evidence of more than one culture. The more significant, or multi-component, sites were located on islands in Placentia Bay and on sand-bars or beaches. There has been very little focused fieldwork in the inner Bay since 1970, other than investigation of known French fortifications at Placentia.

The first phase of the fieldwork investigated seven of eight proposed processing-plant footprint areas. These were found to be rough and virtually trackless, other than the area proximate to the "ERCO Road" from the old plant site to Rattling Brook Big Pond (Coady's Pond). Local informants were forthcoming as to locations for cabins and known areas for hunting and fishing, but were generally dismissive about historic usage of the footprint area: "There's no way to hunt it, and no way to travel it."

Further fieldwork surveyed the waste disposal area. Reporting on desktop analysis and the first phase of fieldwork suggested the east end of Crawley Island as an area of particular potential. This, the earliest settled area within Long Harbour, was the only area where a pre-contact artifact was encountered. Further testing there did not locate other artifacts or features of greater antiquity than the 1930s, other than one ceramic shard possibly of French origin.

### 6.1.4 Potential Interactions

Most anticipated interaction will occur during Project Construction and Operations (Table 6.7). Interactions related to transportation all fall within other (employment or expenditures) Project features.

**Table 6.7 Potential Interactions Matrix: Recreational Activities**

| | Construction | Operation | Decommissioning | Accidental & Unplanned Events |
|---|---|---|---|---|
| **Employment** | | | | |
| Recreational natural resource use | ✓ | ✓ | - | ✓ |
| Recreational leisure activities | ✓ | ✓ | - | ✓ |
| Natural cultural and historic tourism Attractions | ✓ | ✓ | - | ✓ |
| **Expenditures** | | | | |
| Recreational natural resource use | ✓ | ✓ | - | ✓ |
| Recreational leisure activities | ✓ | ✓ | - | ✓ |
| Natural cultural and historic tourism Attractions | - | - | - | ✓ |
| **Transportation** | N/A | N/A | N/A | N/A |

### 6.1.5 Issues and Concerns

There is concern that Construction and Operations phase activity might have negative effects on local lifestyles or the local recreation and tourism industries, in that Project-related affluence and in-migration may lead to increased use of the natural environment, causing damage, congestion and use conflicts. These and other types of issues were raised during stakeholder consultations (see Appendix C) and are addressed in the following sections.

## 6.2 Existing Knowledge

As noted, there is considerable experience with the effects of large industrial projects on services and infrastructure in the province generally and within the Study Area particularly. This has shown that any negative effects on the socio-economic environment, including those on recreational activities, have generally been minor and of short duration (see Section 5.3). Increased affluence has permitted greater expenditures on the use of recreational resources, but there is little evidence that they have experienced excess demand, and the increased demand and associated user-pay has in some cases increased the economic viability of recreational facilities.

Few effects on resource use are expected during the Construction Phase as workers at large-scale construction projects such as this typically work long hours (12-hour shifts) for extended periods (e.g. 10 days). They may commute to the work site on a daily basis or reside in construction accommodations. Construction workers therefore have limited amounts of time for recreation during their work cycle. When time permits, those who commute daily would likely pursue their usual recreational interests in their home communities, while those in the construction accommodations would typically take advantage of recreation facilities provided there. During their time-off, daily commuters would again likely spend the time in their own communities and engage in their usual recreational pursuits, while the majority of those living in accommodations (particularly those with families) typically return home, while others may choose to spend time in larger communities with more recreational and leisure opportunities. As noted above, experience has been that the net effect is minor, but positive.

In 1996 a survey of Hibernia project workers was undertaken to explore patterns of personal expenditures (Community Resource Services 1996). It was assumed that there would be significant differences in expenditure levels and patterns between different groups (e.g., single/married; construction site/St. John's based; local/in-migrants; in-migrants with/without families). Table 6.8 summarizes expenditures for one year, by recreation activity type, for in-migrant workers.

No data were collected for this survey on activities not involving direct expenditure, e.g. walking/hiking. The data distinguish between single and married workers but not between those working at the construction site and those working in St. John's. Construction workers were on a roster system and typically returned home during the non-work part of the cycle. Those working in St. John's were typically short-term/semi-permanent residents. The recreational activities of each group are likely to be different, with semi-permanent workers more likely to spend money on activities such as tourism, skiing, and curling. While recognizing the limitations of these data, tourism, hunting (except for single persons), and fishing were the activities on which most money was spent. These types of interests seem likely to be common to all workers involved in this phase.

**Table 6.8 Average Expenditure on Recreation Activities, In-Migrant Hibernia Construction Project Workers, 1995-1996 Year**

| Recreation/Leisure Category | Single Workers ($) | Married Workers ($) |
|---|---|---|
| Tourism | 1,727 | 2,097 |
| Hunting | 228 | 1,914 |
| Fishing | 950 | 872 |
| Golfing | 311 | 643 |
| Tennis | 740 | 543 |
| Skiing | 329 | 735 |
| Curling | 90 | 180 |
| Flying lessons | -- | 100 |
| Scuba diving | 300 | 100 |
| Other sports | 475 | 1,448 |
| Concerts/Theatre/Arena | 168 | 216 |

**Note:** All data collected were personal estimates of annual expenditures except for concerts, theatre and arena ticket purchases, which were estimated as weekly expenditures in the survey and annualized here.
**Source:** Community Resource Services (1996).

Operations will result in in-migration and an increase in the number of users of a variety of resources and types of infrastructure. There is little information about provincial experience with recreation and related resource use effects of these groups, but anecdotal information suggests that migrants are likely to become involved in local recreational activities, not only for direct enjoyment but also as a way to gain entry into the local society. Joining recreation and leisure-related clubs and organizations is a way for newcomers to meet people. There is no indication that those moving into an area have had any negative effects on resource use; on the contrary, incomers may have positive effects through their involvement.

## 6.3 Recreational Activities Assessment

Project infrastructure and the physical presence of the Project itself could have some effects on recreational activities. For example, a new access road will be built between Route 101 and Sandy Pond, but this will have controlled access and hence will not open up new hunting, trapping, angling or berry-picking areas, or facilitate access to old ones. Unauthorized public access to the property will be prohibited.

For some, the visual impact of the Project may deter hiking in the area, while others may be attracted by it. Construction and Operations activities may in fact attract some industrial tourists, as occurred with the construction of the Hibernia platform, and some visitors have been drawn to the Demonstration Plant at Argentia. There will likely be some increase in tourism activity and expenditures by business visitors who choose to combine work and recreational activities.

Roadside (gravel-pit) camping is a common activity in Newfoundland and concern had been expressed that some construction workers will choose this as a form of accommodation. As was noted in Section 5.4.8, there are no legal means for Vale Inco NL to prevent it, although the Department of Transportation and Works can remove vehicles that obstruct general road maintenance or interfere with

public safety. The establishment of well-appointed worker accommodations is, however, likely to deter workers from choosing to live in campers at unserviced and unregulated sites, and Vale Inco NL will work with its contractors and with provincial and municipal authorities in seeking to discourage such camping.

Increased income levels resulting from Project employment could lead to increased expenditures on recreational equipment (e.g., ATVs, snow machines, boats), and increased use of recreational land and resources. This is most likely to happen in the Study Area during the Operations Phase. Given the potential numbers of additional users, any such increases are not expected to have a significant negative effect on either the resources or the quality of experience by individual users.

On the other hand, increased use of sports infrastructure, once again primarily during the Operations Phase, may result in benefits to users if increased involvement means greater revenue and potential expenditures on sports facilities, and if greater numbers of participants increase the viability of team or club sports.

With respect to historic resources, it is quite unlikely that there is a significant pre-contact site in the proposed footprint area, given its general lack of site advantage and, in particular, its extensive industrial disturbance at the shoreline. While both pre-contact and early historic peoples of Newfoundland made use of interior resources, all were primarily coast dwellers. Their main activities inland were hunting, trapping and gathering fuel – activities that in pre-industrial societies occurred in corridors of traditional access from coastal locations. Usage and transit were heaviest along major river or lake systems, and is most visible at landmarks associated with water features (portages, coves, and shallows in salmon rivers). In general, the Project Site does not present these classic attributes of a high-expectations archaeological prospect. The very limited known historic use of the Project Site is probably indicated for the pre-contact era as well.

### 6.3.1 Optimization

As no significant adverse effects are anticipated, no optimization strategies to avoid or mitigate potential outcomes are considered necessary. In some cases control mechanisms (e.g., hunting regulations) are already in place to ensure that increased demand does not adversely affect the resource in question. These and similar regulations will address any potential concerns. Where regulatory control mechanisms are not in place (e.g., angling), the numbers of additional participants and the dispersed geographic area over which the activity will likely take place is such that no formal actions are considered necessary.

During Operations Phase activities, in particular, local recreation groups and organizations may encourage participation of in-migrants as a means of strengthening the activity in question.

### 6.3.2 Accidental Events

As discussed in Section 3.5, accidental events can lead directly to effects on the socio-economic environment or indirectly as a result of damage to the biophysical environment. Particular concerns are associated with the effects on human health and safety, economic and, as is the focus here, recreational activities. The severity of effects from accidental events depends on, among other factors, the magnitude of the event, its location, and, in some cases, the time of year.

Specific types of accidental events were considered for this assessment:

- Accidental release of hazardous materials into the marine environment (Long Harbour);
- Accidental release of hazardous materials from the plant to the surrounding terrestrial environment; and
- Accidental release of chlorine gas from the plant to the airshed surrounding it.

Recreational land and resources could be adversely affected if the accidental event directly compromises the resources themselves, e.g., through pollution or by constraining access to those resources. If the health of individuals is affected by the accidental event, participation in some activities may be affected.

Table 6.9 summarizes the residual effects of these types of accidental events. By virtue of the nature of the event, outcomes are inevitably likely to be adverse, but their magnitude and duration in particular are unpredictable. In a worst case situation the effects would be *Negative* and *Significant*, and this is reflected in the Significance ratings given in Table 6.9. Every attempt will be made through various safety plans and preventive mechanisms to avoid these accidental events. Where a residual effect has the potential to be significant (negative), appropriate mitigation measures would be applied by Vale Inco NL including, for example, provision/facilitation of access to alternate natural resources for recreational use, or financial support for community-based recreational leisure activities.

**Table 6.9 Accidental Events, Residual Effects and Significance - Recreational Activities VEC**

| Attribute | Recreational Natural Resource Use | Recreational Leisure Activities | Natural, Cultural, and Historic Tourism Attractions |
|---|---|---|---|
| **Direction** | negative | negative | negative |
| **Magnitude** | unknown | unknown | unknown |
| **Geographic Extent** | local | local | local |
| **Duration** | unknown | unknown | unknown |
| **Level of Confidence** | low | low | low |
| **Certainty of Occurrence** | low | low | low |
| **Significance** | **Significant Negative** | **Significant Negative** | **Not Significant** |

### 6.3.3 Residual Impacts and Significance

No significant residual adverse effects are anticipated for the Recreational Activities VEC. Some positive residual effects may be experienced by some VEC components, but these are expected to be relatively minor. The residual effects and their significance are summarized in Table 6.10.

**Table 6.10 Residual effects and Significance: Recreational Activities VEC - Summary for All Project Phases**

| Attribute | Recreational Natural Resource Use | Recreational Leisure Activities | Natural, Cultural, and Historic Tourism Attractions |
|---|---|---|---|
| **Direction** | neutral | positive | positive |
| **Magnitude** | negligible | negligible | negligible |
| **Geographic Extent** | local | local | local |
| **Duration** | long-term | long-term | long-term |
| **Level of Confidence** | medium | medium | medium |
| **Certainty of Occurrence** | medium | medium | medium |
| **Significance** | **Not Significant** | **Significant Positive** | **Significant Positive** |

### 6.3.4 Follow-up

In the absence of any anticipated adverse significant effects, no special follow-up is considered necessary. Existing organizations (e.g., tourism attractions, hunting and fishing regulators) maintain records of activity use as part of their normal operating practice. Should there be any unanticipated effects of the Project, they will become evident through these monitoring processes.

## 6.4 Summary of Effects for Recreational Activities

The Project is not expected to have any significant adverse residual effects on recreational activities and non-commercial resource use, except in the case of an accidental event, which is likely to be a rare occurrence. On the other hand, there may be some positive outcomes if in-migrants become involved in local recreational and leisure activities, and their membership benefits the group or activity in question. In summary the effects of the Project on the Recreational Activities VEC are expected to range between *not significant* and *significant positive.*

# 7.0 Commercial Fisheries and Aquaculture

This section describes and assesses the potential effects of the Project on the commercial fisheries and aquaculture VEC, which includes commercial wild fisheries, aquaculture and fish processing. As noted earlier, the assessment methodology is that described for the biophysical VECs in Volume 2.

## 7.1 Existing Conditions

The statistical information and analysis in this chapter are based primarily on time-series data from DFO, Newfoundland and Labrador Region and Maritimes Region, which describe the quantity, month and location (by fisheries management Unit Area) of fish harvesting. Although only a very small proportion of the harvest from within 3Psc (Figure 7.1) is landed in Maritimes (Nova Scotia) Region (less than 15 t in 2005), these datasets are included within the Newfoundland Region data and are used in this analysis. The datasets also include information on fishing gear and vessels, and other information. They were acquired from DFO in digital form for the period 1984 to 2005, but this description focuses mainly on the current fisheries environment, i.e., the period 2003-2005.

The Unit Area 3PSc dataset captures species harvested from 3PSc wherever they were landed or processed. Thus, catches by fishers who are not based in Placentia Bay are included, while catches made by Placentia Bay-based vessels are excluded if they were harvested beyond the 3PSc area.

The calculation of the value of the fisheries is much more complex. In addition to variability that results from changes in the quantity of harvest from year to year (whether due to natural variability or changing quotas), prices also vary from year to year and even within the fishing season. Consequently, much of the historical analysis provided in this section involves quantity of harvests (tonnes of fish landed), which is directly comparable from year to year.

Where current landed values for the fisheries are given, they are calculated based on average annual quantities of landings for 2003-05, applying the most recently available prices. Specifically, these prices are the average landed amounts paid to harvesters in 2005 (averaged over all months) for relevant species within the Newfoundland and Labrador Region (http://www.nfl.dfo-mpo.gc.ca/publications/reports_rapports/Land_All_2005.htm).

Data on aquaculture were provided by the provincial Department of Fisheries and Aquaculture (DFA), including its AquaGIS database.

Other sources consulted for this section include Northwest Atlantic Fisheries Organization (NAFO) data used to capture historical foreign fishing quantities in the French territory of St-Pierre et Miquelon and elsewhere, fisheries management plans, stock status reports, quota reports, and other DFO and DFA documents (LGL 2007).

Consultations for this analysis were undertaken with aquaculture managers with DFA, CCG VTS at Argentia, and fishers from the Long Harbour area. Extensive consultations undertaken with fish processing operators and DFO resource managers in both 2004 and 2006 were also utilized for this report (LGL 2007).

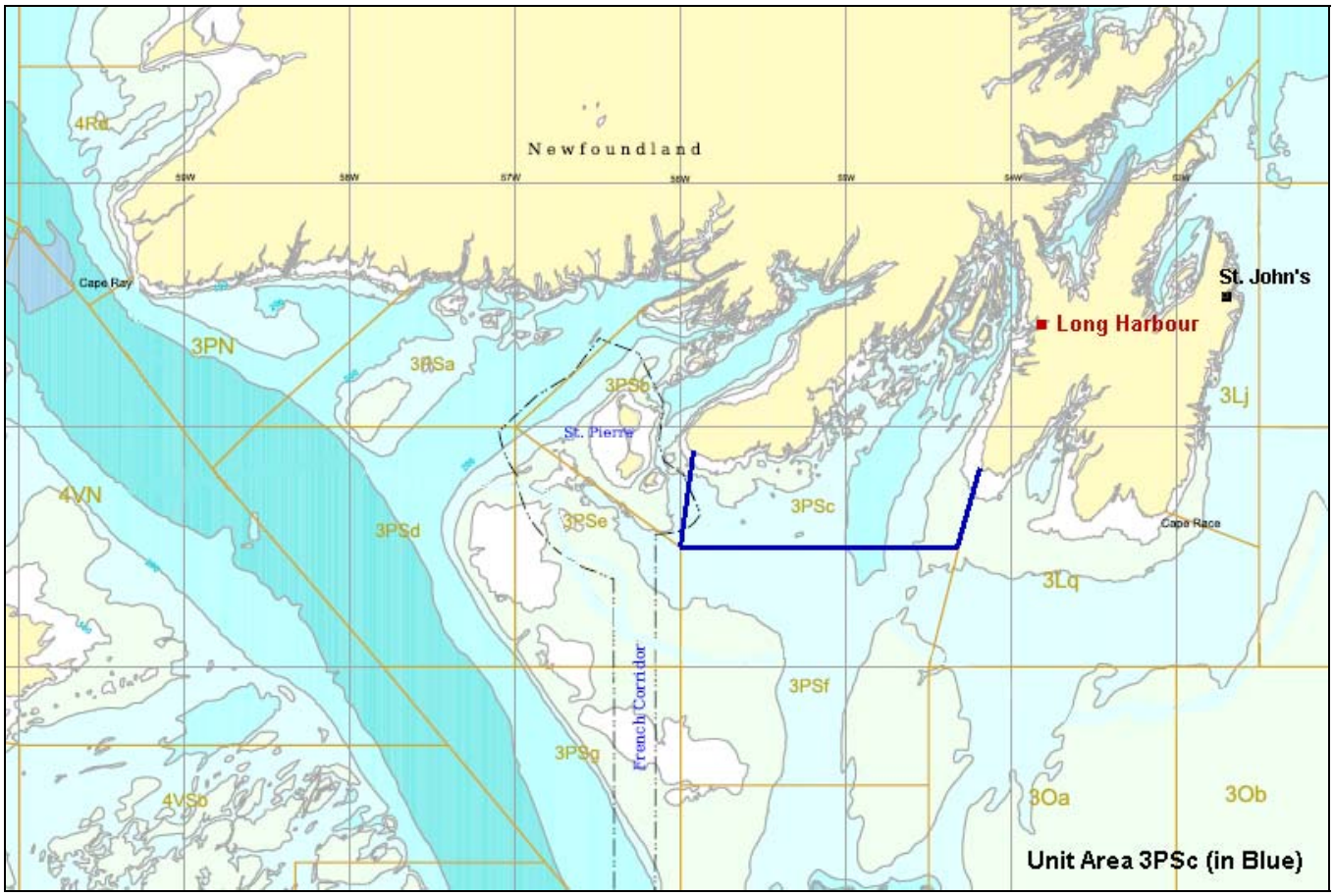


**Figure 7.1 Unit Area 3PSc Boundaries**

### 7.1.1 Wild Commercial Fisheries

This section presents a review of the commercial fisheries harvesting environment in the Placentia Bay area. This includes the historical context, species harvested, the monthly distribution of activities, type of gear used and geographic location of fishing activities. The focus for the following analysis is the domestic Canadian wild (non-aquaculture) harvest within and adjacent to Placentia Bay. This section describes the species harvested, typical harvesting locations, seasonality of the harvest and harvesting methods used, as well as the landed quantities and value of the catch.

## Historical Context, 1980s to the Present

Drastic changes have occurred in the Newfoundland and Labrador fisheries over the past two decades. On many parts of the Grand Banks, commercial fish harvesting has changed from completely groundfish-based to more crustacean-based. In 1992 and 1993, with the acknowledgement of the collapse of several groundfish (demersal) stocks, a harvesting moratorium was declared, and directed fisheries for Atlantic cod were no longer permitted in most areas. Subdivisions 3Ps and 3Pn have been exceptions and are now the only remaining Grand Banks areas with a directed (although reduced) Atlantic cod fishery. However, harvesting activities in 3Ps (including Placentia Bay) were still affected by the moratoria. For example, within 3PSc for the period 1984-1990, 74 per cent of the catch by quantity was cod while snow crab made up just 3 per cent; during 1994-1995, immediately after the moratoria were imposed, cod made up only 6 per cent of the harvest and snow crab catches had increased to 24 per cent. In terms of value, cod accounted for nearly 60 per cent of the value of the 3PSc harvest (1984-1992), but only a negligible amount in 1994-1995. A limited cod fishery was reinstated in 3PSc in 1997 under a strict management regime, and during 2000-02 cod again accounted for nearly 60 per cent of the harvest by quantity. However, in recent years quotas have again been reduced.

Figure 7.2 and Figure 7.3 compare the catch composition for 1984-1986 to the composition during 2003-05.

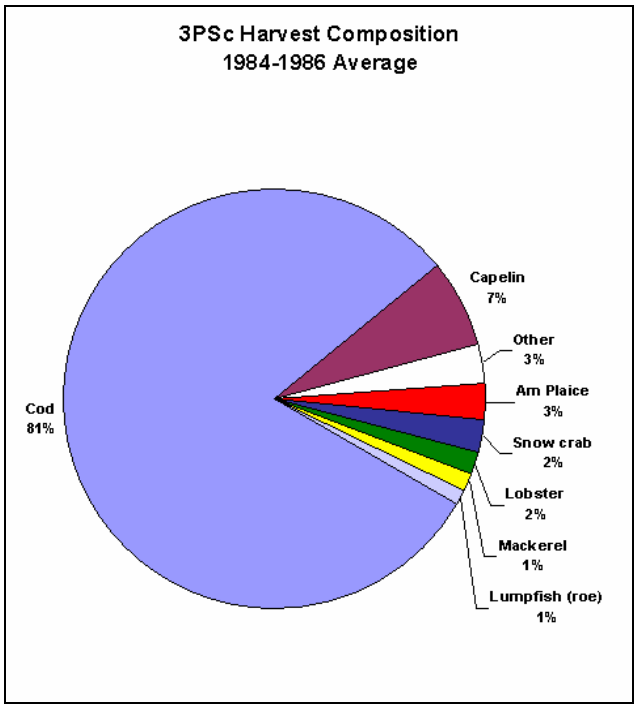


**Figure 7.2 3PSc 1984-86 Fisheries**

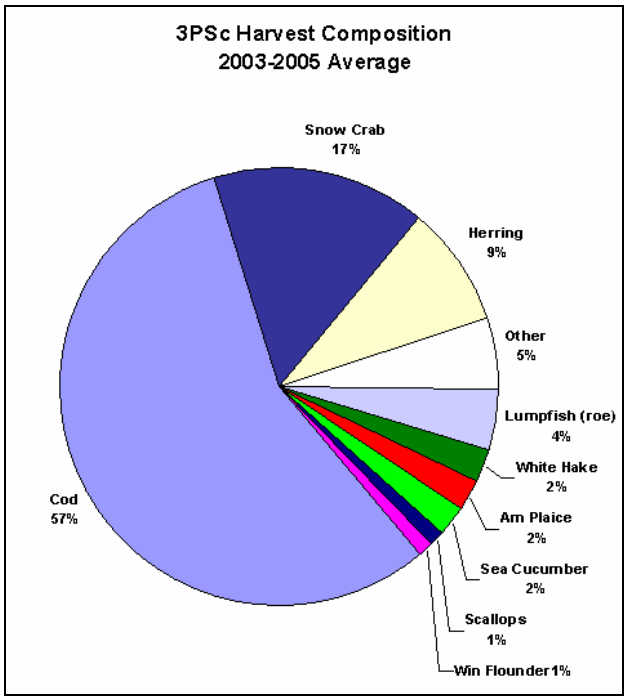


**Figure 7.3 3PSc 2003-05 Fisheries**

The changes in the quantity of the harvest from 3PSc over the last 20 years (1986-2005) are shown in Figure 7.4 and Figure 7.5. Figure 7.4 shows the overall quantity harvested (all species), and Figure 7.5 compares groundfish and shellfish harvests (mainly snow crab, scallops and lobster) over this period.

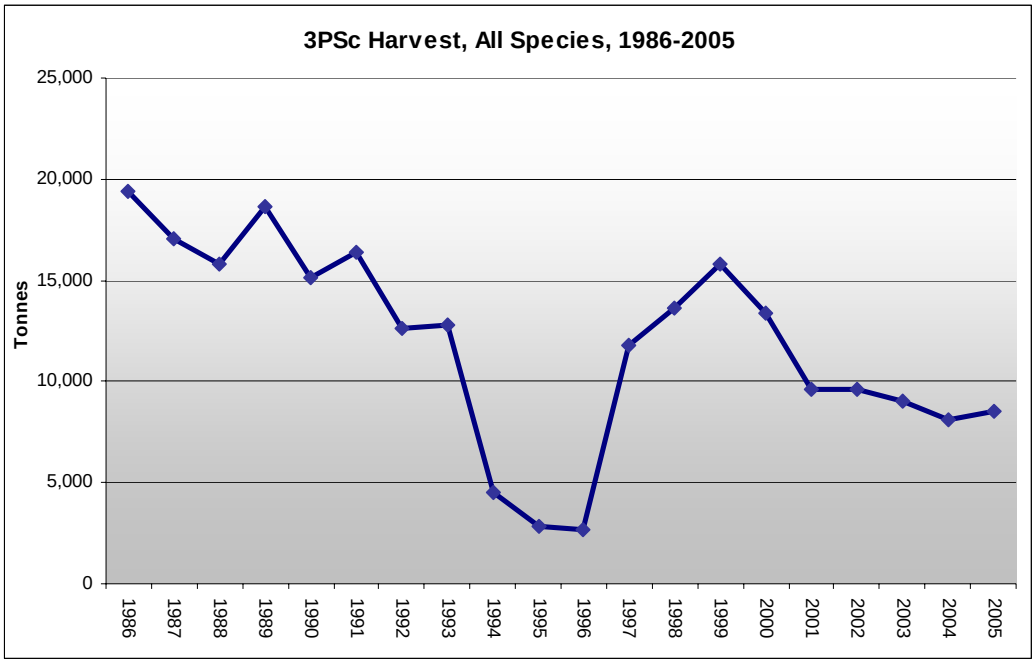


**Figure 7.4 3PSc Harvest, 1986-2005**

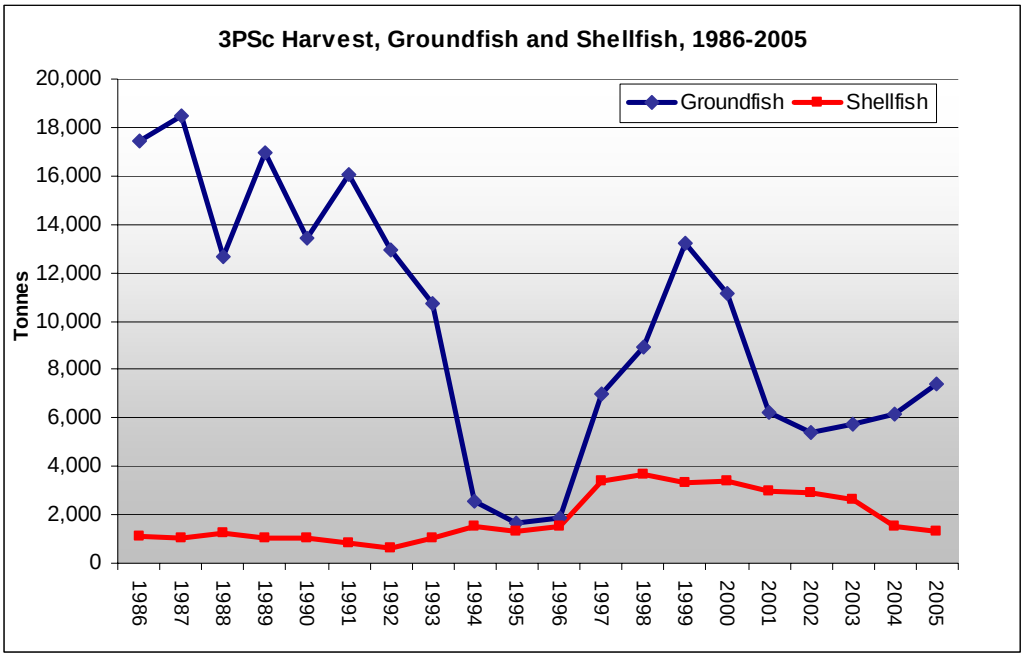


**Figure 7.5 3PSc Harvest, Groundfish vs. Shellfish, 1986-2005**

Between 1986 and 1995, the quantity of biomass taken from Placentia Bay declined from over 17,000 t to under 2,000 t, a drop of nearly 90 per cent. However, the landed value of the 3PSc fishery did not experience a similar decline, owing to the changed composition of the catch, made up (in 1995) primarily of high-priced species such as lobster, snow crab and lumpfish roe. In that year, the value of the fishery was only 8 per cent lower than in 1986 (approximately $9,740,000 vs. $10,634,000). Value continued to rise after 1995; by 2002, the harvest from 3PSc was worth more than $18 million, nearly 180 per cent of the value of the harvest in 1986. Even with weaker prices in recent years, snow crab is still a very valuable species.

Since the mid-1990s the fisheries, fisheries management and licencing regimes in Placentia Bay have continued to evolve. Most significantly, a fish harvesting rationalization strategy reduced the number of participants in the harvesting sector, and a professionalization process was introduced, prescribing specific levels of experience and training required to be a professional fish harvester. Along with this system, DFO introduced the "core" harvesting enterprise designation, with restrictions on harvesting by those who are not part of such an enterprise.

In recent years (since 2004 in particular), the value of the Newfoundland and Labrador fisheries has again declined, severely affected by the prices paid for crab and shrimp, and sharp losses in landed values continued through 2006. In Placentia Bay, however, the decline has not been as severe since groundfish still makes up such a significant part of fisheries.

## Current Commercial Fisheries

The composition of the harvest in 3PSc in recent years, based on 2003-05 landings (averaged), and the value of these landings based on 2005 prices is shown in Table 7.1. As these data show, cod is still by far the most important species harvested in the area, with snow crab, herring, and lumpfish (roe fishery), scallops and a few other groundfish species making up most of the remainder.

In terms of economic value, the area's commercial fishers depend on four species (cod, snow crab, lumpfish and lobster) for 90 per cent of their annual income. While lobster accounts for only a small percentage by weight of the annual catch (<1%), given its consistently high value, this species remains very important to many area fishers (nearly 7 per cent of the total value). Although the herring fishery is important, especially for bait, it does not have the direct economic value of the other large fisheries.

### *Seasonality*

Some harvesting is conducted year-round in Placentia Bay (see Figure 7.6), as it was in the pre-moratoria period, though in recent years it has been much less evenly distributed throughout the year. Since 1996 the peak harvesting months have been June and July, but there has also been a fairly strong cod fishery in late fall. More details on the timing of key species fisheries in the area are provided below.

The seasons, for management purposes, of harvesting for species in Placentia Bay in recent years are shown in Table 7.2.

### *Harvesting Locations*

Locations recorded in the DFO georeferenced dataset for all species (see Table 7.3), 2003–05, are shown in Figure 7.7 through Figure 7.9. However, this represents a small sub-set of the 3PSc harvest, and some years have fewer data than others (e.g., just 2 per cent in 2005).

Lobster fishing locations are not georeferenced in the datasets; however, lobster is harvested close to shore, typically close to the community where the fisher lives.

### *Fishing Gear*

The Placentia Bay fisheries employ both mobile gear (typically towed by a ship) and fixed gear (set out and left by the fisher, typically anchored or weighted in place). Fixed gear fisheries (e.g., gillnets, or lobster and crab pots) tend to be more site-specific than mobile fisheries, with fewer alternative grounds available. Also, fixed gear may be left in place by the fisher for several days while the fishing boat returns to port. Mobile fishing gear (e.g., otter trawls or scallop dredges) is always accompanied by the fishing vessel.

## Table 7.1 3PSc Harvest, 2003-2005 (Annual Average)

| UA / Species | Tonnes | % of UA Quantity | Value ($) | % of UA Value |
|---|---|---|---|---|
| Atlantic cod *(Gadus morhua)* | 4,805.2 | 56.3% | 5,190,858 | 40.1% |
| Haddock *(Melanogrammus aeglefinus)* | 16.1 | 0.2% | 15,272 | 0.1% |
| Redfish *(Sebastes* spp.) | 5.1 | 0.1% | 2356 | 0.0% |
| Atlantic halibut *(Hippoglossus hippoglossus)* | 4.4 | 0.1% | 28,195 | 0.2% |
| American plaice *(Hippoglossoides platessoides)* | 198.0 | 2.3% | 144,063 | 1.1% |
| Yellowtail flounder *(Limanda ferruginea)* | 6.5 | 0.1% | 4,857 | 0.0% |
| Greysole (Witch) flounder *(Glyptocephalus cynoglossus)* | 1.7 | 0.0% | 487 | 0.0% |
| Winter flounder *(Pseudopleuronectes americanus)* | 86.1 | 1.0% | 36,082 | 0.3% |
| Turbot (Greenland halibut) *(Reinhardtius hippoglossoides)* | 2.9 | 0.0% | 5,943 | 0.0% |
| Skate *(Raja* spp.) | 56.8 | 0.7% | 13,774 | 0.1% |
| Pollock *(Pollachius virens)* | 48.8 | 0.6% | 24,739 | 0.2% |
| White hake *(Urophycis tenuis)* | 198.9 | 2.3% | 127,170 | 1.0% |
| Monkfish *(Lophius americanus)* | 55.6 | 0.7% | 89,480 | 0.7% |
| Roughhead grenadier *(Macrourus berglax)* | 1.5 | 0.0% | 402 | 0.0% |
| Hagfish *(Myxine glutinosa)* | 60.2 | 0.7% | 106,226 | 0.8% |
| Herring *(Clupea harengus)* | 754.6 | 8.8% | 183,002 | 1.4% |
| Mackerel *(Scomber scombrus)* | 12.3 | 0.1% | 6,252 | 0.0% |
| Capelin *(Mallotus villosus)* | 25.1 | 0.3% | 7,188 | 0.1% |
| Scallops *(Placopecten magellanicus)* | 17.9 | 0.2% | 28,050 | 0.2% |
| Whelks *(Buccinum undatum)* | 28.4 | 0.3% | 30,043 | 0.2% |
| Icelandic scallops *(Chlamys iskandica)* | 100.6 | 1.2% | 141,955 | 1.1% |
| Sea cucumber[1] *(Cucumaria frondosa)* | 192.5 | 2.3% | 110,363 | 0.9% |
| Sea urchins *(Strongylocentrotus droebachiensis)* | 31.5 | 0.4% | 47,238 | 0.4% |
| Lobster *(Homarus americanus)* | 71.9 | 0.8% | 859,009 | 6.6% |
| Snow crab *(Chionoecetes opilio)* | 1,367.6 | 16.0% | 4,371,894 | 33.8% |
| Lumpfish (roe) *(Cyclopterus lumpus)* | 379.9 | 4.5% | 1,356,616 | 10.5% |
| Other | 1.8 | 0.0% | 2,508 | 0.0% |
| UA Total | 8,532.1 | 100.0% | 12,935,022 | 100.0% |

**Notes:** [1]Although the DFO data identify this harvest as "sea cucumbers" (*Cucumaria frondosa*), DFO managers consulted believe this is an error in the dataset, either associated with the incorrect Unit Area designation (sea cucumbers are harvested off Saint-PierreBank in 3Ps), or the incorrect species code was used when the data were entered. If the latter, these may be scallops (code 618 vs. code 619).

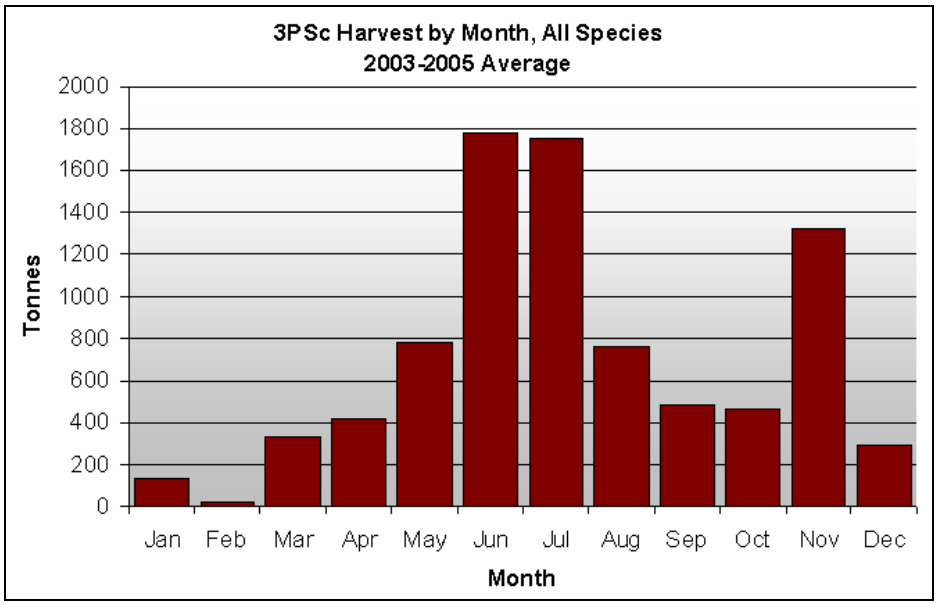


**Figure 7.6 UA 3PSc Harvest by Month**

**Table 7.2 Species Management Seasons**

| Species | Season |
|---|---|
| Lobster | April 20 to June 30 |
| Crab | April to September (or as per current year Management Plan) |
| Sea urchins | October 1 to April 1 |
| Lumpfish | May 1 to June 15 (opening/closing dates may vary) |
| Scallops | January 1 to December 31 (but usually closed during lobster season) |
| Herring (fixed gear) | 1 March to 31 May and reopened September to December 31 (or until quota is reached) |
| Herring (mobile gear) | Same as above |
| Winter flounder | Mid-May to December (for 2003) |
| Squid | June to December, depending on availability (but this species usually appears in early to late fall) |
| Capelin | June to August, depending on the quota and market demand |
| Cod | Early May to end of February the following year; closed during March and April (spawning season) |

In many cases, the fishing gear used in Placentia Bay is specific to the species harvested: pots for snow crab, scallop drags for scallops, and diving for sea urchins. Cod is harvested using several gear types, but primarily with gillnets, which accounted for 87 per cent in 2003-05). Table 7.3 shows the quantity of the harvest by each gear type for the period 2003-05. Overall, during 2003-05, nearly 85 per cent of the harvest was taken with fixed gear.

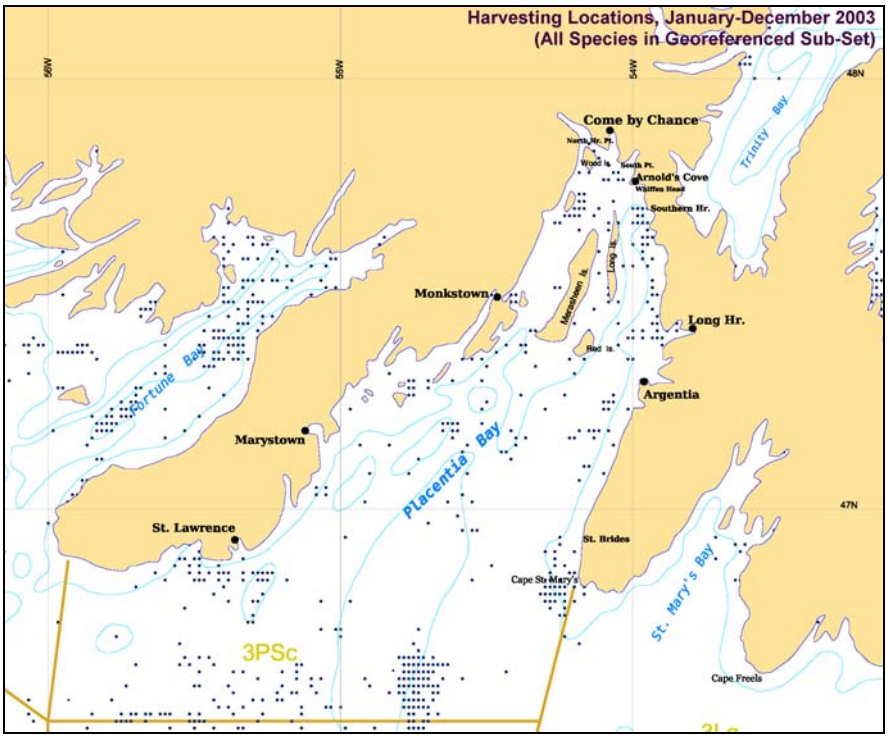


**Figure 7.7 2003 Georeferenced Harvesting Locations, All Species, All Months**

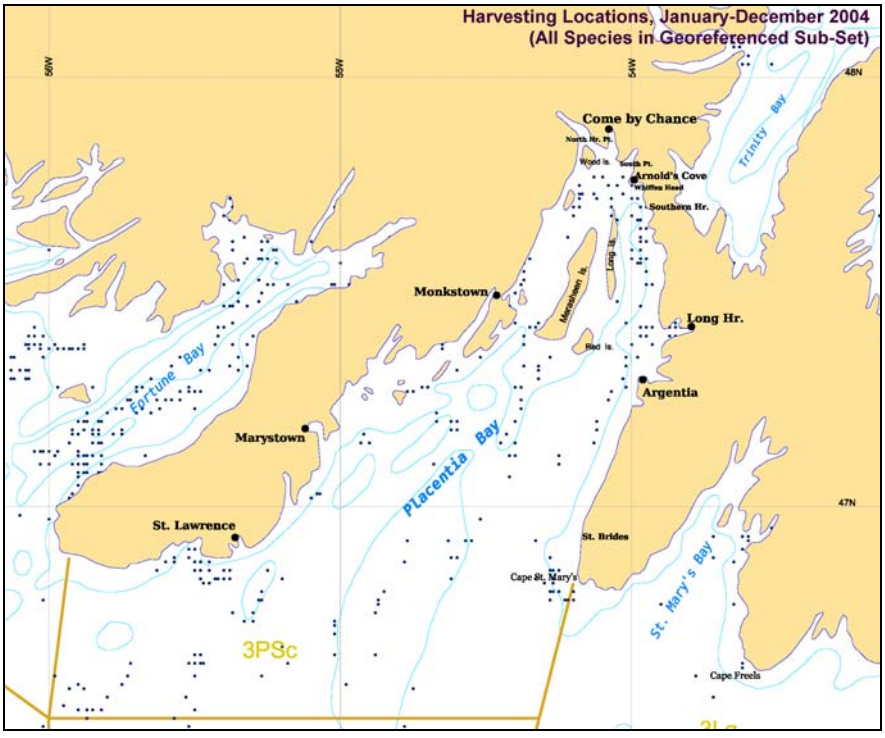


**Figure 7.8 2004 Georeferenced Harvesting Locations, All Species, All Months**

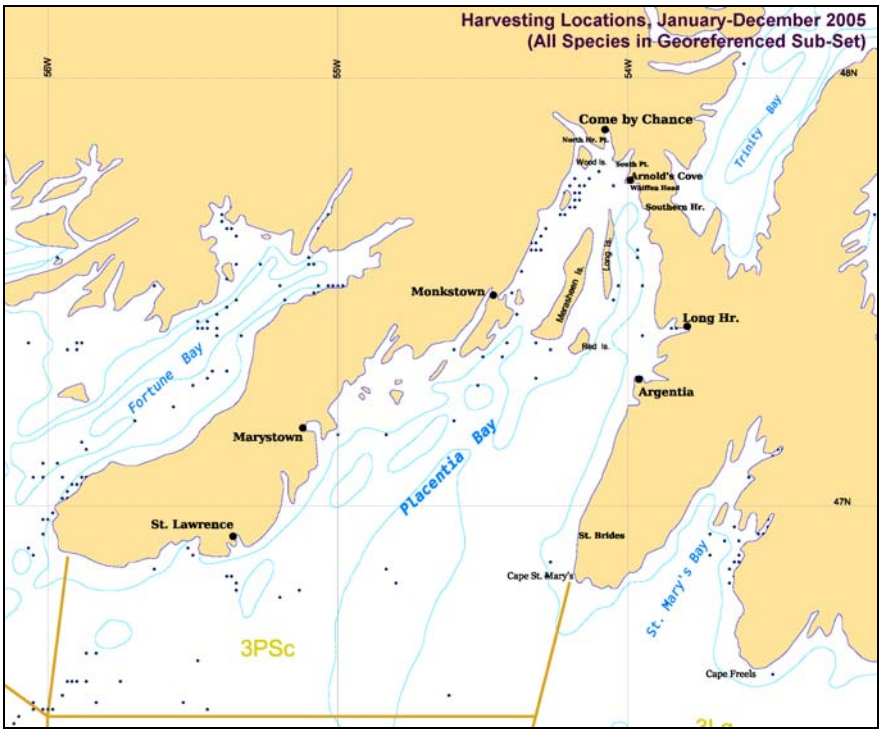


**Figure 7.9 2005 Georeferenced Harvesting Locations, All Species, All Months**

**Table 7.3 3Ps Harvest by Gear Type, 2003-2005 Average**

| Gear | Tonnes | % of Total |
|---|---|---|
| Stern Otter trawl | 58.8 | 0.7% |
| Danish seine | 1.2 | 0.0% |
| Beach/Drag/Bar seine* | 37.5 | 0.4% |
| Purse seine | 644.7 | 7.6% |
| Gillnet* | 5,266.7 | 61.7% |
| Longline* | 329.2 | 3.9% |
| Hand line | 267.4 | 3.1% |
| Trap net* | 56.5 | 0.7% |
| Trap/Pot* | 1,465.5 | 17.2% |
| Drag/Dredge | 311.1 | 3.6% |
| Diving | 31.5 | 0.4% |
| Hagfish barrel* | 60.2 | 0.7% |
| All others | 1.9 | 0.0% |
| Total | 8,532.0 | 100.0% |

**Note:** * Fixed gear.

### *Boats, Enterprises, and Licences*

The fisheries in Placentia Bay are pursued mainly in small (<10.7 m) boats. The quantity harvested from 3PSc by each class (length) for the period 2003-05, averaged, is shown in Table 7.4. The number of core and non-core enterprises by community and vessel length for Placentia Bay (Fishing Area 10) in 2003 is shown in Table 7.5. Table 7.6 lists the numbers of licences. Data on the number or core and non-core fishing enterprises in Placentia Bay, as well as information on the distribution of species licences, were provided by the DFO Licensing Branch in St. John's for the year 2003. It is likely that these data closely reflect the current situation in the area.

A "core" fishing enterprise is a commercial fishing enterprise holding key species licences, under the system established by DFO in 1996. New core enterprises are not normally created, although existing enterprises may be transferred to a new eligible harvester. DFO requires that the transfer go to a Level II professional fish harvester as certified by the Professional Fish Harvesters Certification Board (PFHCB) of Newfoundland and Labrador. A non-core enterprise is one holding other (perhaps single) species licences.

The DFO datasets indicate fishing vessel home ports for about 57 per cent of the 2005 catch (by quantity) in UA 3PSc. Of these, 98 per cent are harvested by vessels registered in ports adjacent to 3PSc (i.e., within Statistical Sections 29-32, Area H). The port of landing of the harvest is indicated for 100 per cent of the catch, and the locations range more broadly in many ports around the Island of Newfoundland and in Nova Scotia. These data indicate that, in 2005, almost 82 per cent of the harvest was landed in Placentia Bay ports, although this does not mean it was processed there.

**Table 7.4 UA 3PSc Harvest by Vessel Class, 2003-2005 Averages**

| Vessel (Length) Class | | Tonnes | % of Total |
|---|---|---|---|
| 1 - 34 feet | (0.30 – 10.4 m) | 6406 | 75.1% |
| 35 - 44 feet | (10.7 – 13.4 m) | 1,541 | 18.1% |
| 45 - 54 feet | (13.7 – 16.5 m) | 231 | 2.7% |
| 55 - 64 feet | (16.8 – 19.5 m) | 354 | 4.2% |
| 65 - 74 feet | (19.8 – 22.6 m) | 0 | 0.0% |
| 75 - 99 feet | (22.9 – 30.2 m) | 0 | 0.0% |
| 100 - 124 feet | (30.5 – 37.8 m) | 0 | 0.0% |
| 125 - 149 feet | (38.1 – 45.4 m) | 0 | 0.0% |
| 150 - 199 feet | (45.7 – 60.7 m) | 0 | 0.0% |
| 200 feet+ | (61.0 m+) | 0 | 0.0% |
| Total | | 8,532 | 100.0% |

## Table 7.5 Number of Core and Non-core Enterprises and Vessel Size, Placentia Bay (2007)*

| Home Port | <35 ft (10.7 m) | 35-64 ft (10.7 m-19.5 m) | Total |
|---|---|---|---|
| St. Bride's | 33 | 12 | 45 |
| Patrick's Cove | 3 | | 3 |
| Placentia (incl. Southeast) | 10 | 11 | 21 |
| Dunville | 5 | | 5 |
| Jerseyside | 3 | 1 | 4 |
| Freshwater, P. Bay | 3 | | 3 |
| Fox Harbour | 8 | 4 | 12 |
| Ship Harbour | 5 | 2 | 7 |
| Long Harbour | 2 | 1 | 3 |
| Mount Arlington Heights | 3 | | 3 |
| Fair Haven | 15 | 1 | 16 |
| Little Harbour East P.B. | 16 | 5 | 21 |
| Southern Harbour | 28 | 20 | 48 |
| Arnold's Cove | 18 | 4 | 22 |
| Come By Chance | 4 | | 4 |
| North Harbour, P.B. | 13 | 2 | 15 |
| Garden Cove | 6 | | 6 |
| Swift Current | 5 | | 5 |
| Prowseton and Sand Hr. (Vacated) | 3 | 1 | 4 |
| Davis Cove (Vacated) | 5 | 1 | 6 |
| Old Cove-Woody Island (Vacated | 1 | | 1 |
| Bar Haven (Vacated) | 2 | | 2 |
| Haystack (Vacated) | 1 | | 1 |
| Red Island (Vacated) | 5 | | 5 |
| Brule (Vacated) | 1 | | 1 |
| Merasheen (Vacated) | 6 | 1 | 7 |
| Tack's Beach (Vacated) | 2 | | 2 |
| Isle Au Valen (Vacated) | 3 | | 3 |
| Little Paradise (Vacated) | 4 | | 4 |
| Great Paradise (Vacated) | 3 | | 3 |
| South East Bight | 25 | 4 | 29 |
| Monkstown | 6 | 1 | 7 |
| Petite Forte | 16 | 5 | 21 |
| Port Ann (Vacated) | 1 | | 1 |
| Boat Hr (incl. Brookside) | 8 | | 8 |
| Parkers Cove | 12 | | 12 |
| Baine Harbour | 6 | 3 | 9 |
| Rushoon | 2 | | 2 |
| Oderin (Vacated) | 2 | | 2 |
| Red Harbour | 15 | 1 | 16 |
| Jean De Baie | 1 | | 1 |
| Rock Harbour | 1 | | 1 |
| Little Bay, P.B. | 1 | 1 | 2 |
| Beau Bois | 1 | | 1 |
| Fox Cove (near Burin) | 1 | | 1 |
| Port Au Bras | 1 | 1 | 2 |
| Burin, Marystown and Mooring Cove | 20 | 9 | 29 |
| Little St. Lawrence | 3 | | 3 |
| St. Lawrence | 12 | 5 | 17 |
| Lawn | 13 | 11 | 24 |
| Lord's Cove | 11 | 1 | 12 |
| Point Au Gal | 10 | | 10 |
| Lamaline | 20 | 1 | 21 |
| Point May | 8 | | 8 |
| **Total** | **412** | **109** | **521** |

**Note:** *Key Licence Holders Only.

**Table 7.6 Core, Non-core and Recreational Licences, Placentia Bay (2006)**

| Species | Total Licences |
|---|---|
| Bait | 364 |
| Capelin (fixed gear) | 100 |
| Capelin (purse seine) | 1 |
| Eel | 6 |
| Groundfish (fixed gear) | 511 |
| Herring (fixed gear) | 124 |
| Herring (purse seine) | 10 |
| Lobster | 341 |
| Mackerel (fixed gear) | 147 |
| Mackerel (purse seine) | 6 |
| Salmon, Atlantic | 5 |
| Scallop | 223 |
| Scallop, recreational | 156 |
| Seal | 38 |
| Seal, personal use | 32 |
| Snow Crab, inshore | 401 |
| Snow Crab, supplementary | 69 |
| Squid | 268 |
| Tuna, bluefin | 4 |
| Whelk | 212 |
| **Total** | **3,018** |

## Key Species Fisheries

The following sections provide additional information about the principal Placentia Bay fisheries. Groundfish constitute nearly 70 per cent of the Placentia Bay fishery by quantity and 55 per cent by value (based on 2003-05). Cod is the principal species harvested in Placentia Bay, accounting for 56 per cent of the total harvest by quantity during 2003-05 and 40 per cent of its value, while the lumpfish roe fishery makes up 4.5 per cent by quantity and 10.5 per cent by value (see Table 7.1).

### *Cod*

The overall Division 3Ps cod quota includes a small allocation for France and the remainder goes to Canada. The Canadian portion includes small allocations to aboriginal and sentinel fisheries, while the majority of Canada's share is for vessels <30.5 m. DFO (2005) reports that the 3Ps cod stock was exploited heavily in the 1960s and early 1970s by foreign fleets, mainly from Spain, with catches peaking at 84,000 t. After the extension of Canadian jurisdiction in 1977, catches averaged around 30,000 t until the mid-1980s when fishing effort by France increased and total landings reached about 59,000 t. Catches then declined gradually and the moratorium was established in 1993. The 3Ps fishery opened again in May 1997 with a total allowable catch (TAC) of 10,000 t, increasing to 30,000 t in 1999. In 2000, the management year was changed to start on April 1; the fishery is closed during March

because it is the spawning season. For 2000 the TAC was 20,000 t and for the next five management years ending 31 March 2006, the TAC was set at 15,000 t.

Recorded groundfish and Atlantic cod harvesting locations in the Placentia Bay area based on the georeferenced portion of the DFO data are shown in Figure 7.10 and Figure 7.11. These maps show three years (2003-05) of aggregated data to better represent harvesting patterns, although the harvesting locations tend to be quite consistent from year to year. There are virtually no georeferenced lumpfish data.

Individual Quotas (IQ) were established for all participants within the 3Ps zone in 1998. This, as well as the change in the management year period, has had some effect on harvesting and vessel activity patterns and on the monthly distribution of cod catches. In the "competitive" fishery that existed prior to 1998, fishers were more or less obliged to take their share of the TAC as fast as they could in order to compete with other harvesters for their share of this resource. With the establishment of IQs, however, fishers are now free to decide when to catch their allocation, and many have chosen to fish their cod in the fall months or until the end of February of the following year if they do not manage to take all of their allowable catch by November or December.

As a result, cod (and other groundfish) catches are now more evenly spread out over the fishing season, although November (and a lesser extent December) is a relatively more important month for this species, as Figure 7.12 indicates.

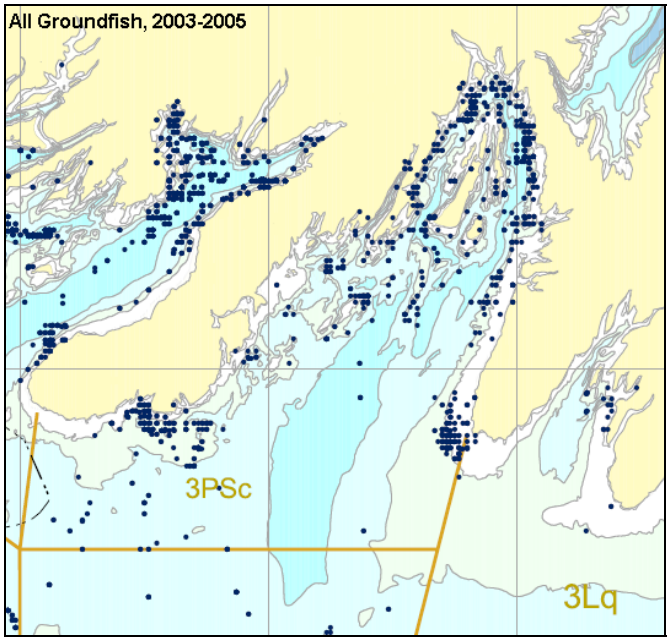


**Figure 7.10 Georeferenced Groundfish Harvesting Locations, 2003 – 2005[1]**

**Note:** [1]Locations plotted on land are due to errors in the original DFO dataset.

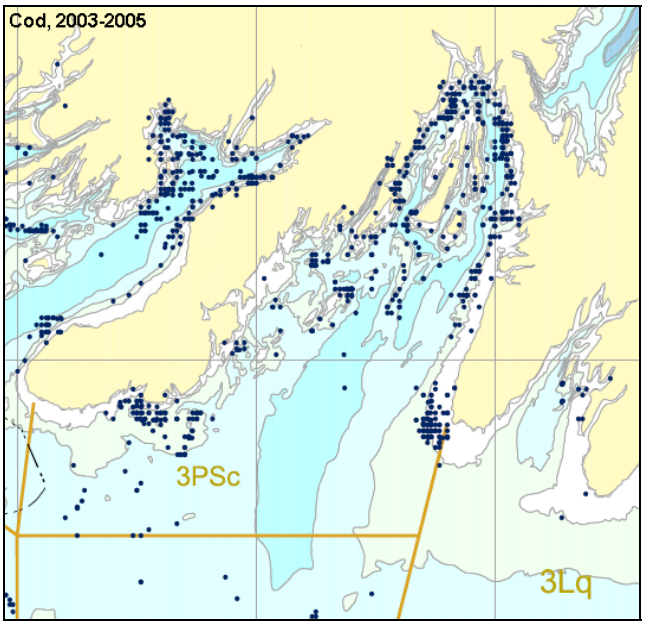


**Figure 7.11 Georeferenced Cod Harvesting Locations, 2003 – 2005[1]**

**Note:** [1]Locations plotted on land are due to errors in the original DFO dataset.

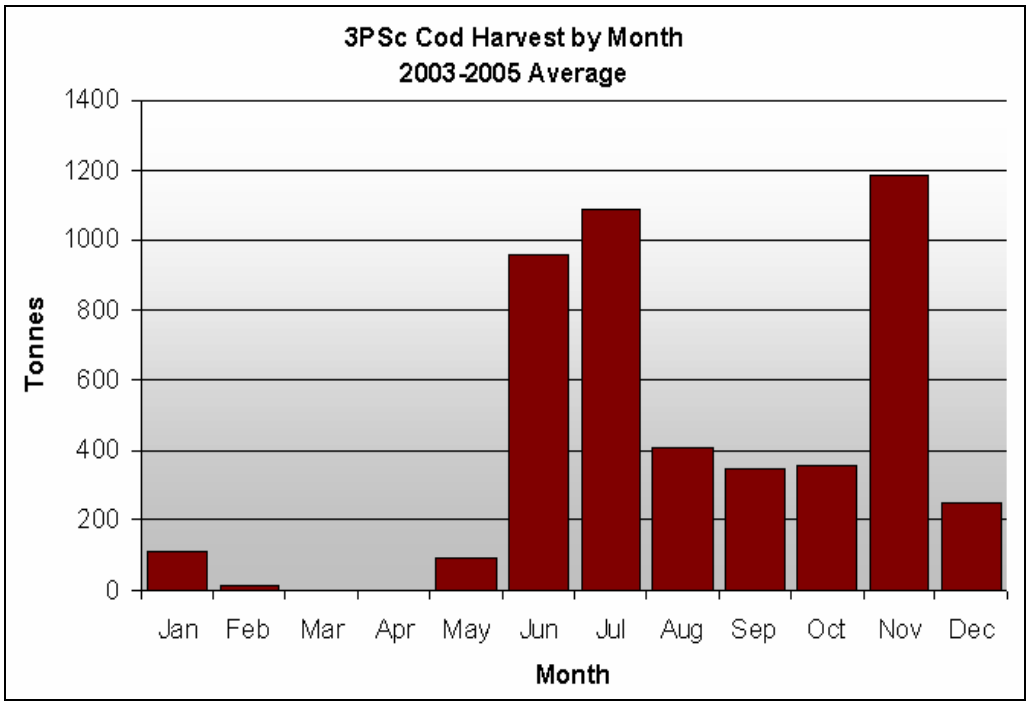


**Figure 7.12 UA 3PSc Atlantic Cod Harvest by Month**

### *Lumpfish*

Lumpfish is harvested for roe; as DFO (2003) notes, the fishery is focused exclusively on pre-spawning mature females, so the spawning stock is vulnerable to over-exploitation. The species is generally taken in the same locations as lobster, including grounds around the islands in Placentia Bay. Lumpfish are harvested using nets (26.7 cm mesh) set relatively close to shore in water depths from 3.7 m to 45.7 m.

During the period 1997-1999, the average annual 3PSc catch of this species generated over 451 t of roe and fetched a high price. However, in the early 2000s, the lumpfish fishery virtually disappeared, dropping to less than 10 t of roe in 2002. For the period 2003-05, it averaged 380 t.

DFO (2002, Stock Status Report A2-17) notes that the fishery has been strictly managed by effort controls since 1992. In both 2001 and 2002 harvesters were limited to a three-week fishery and could use a maximum of 50 nets. DFO reports that "landing trends are influenced by economic factors (roe prices and supply management) and may not reflect trends in lumpfish abundance". It goes on to state "that recent declines [in the early 2000s] in landings may not be fully reflective of the state of the stock. The three-week season for this fishery may not be synchronized with the arrival of lumpfish in the inshore area. Also, effort has been diverted to the more lucrative crab fishery, which is prosecuted at the same time." The usual season for this species is from early to mid-May to the end of June, as Figure 7.13 indicates, but sometimes fishing continues into July (as was the case in 2003 when it closed on July 12).

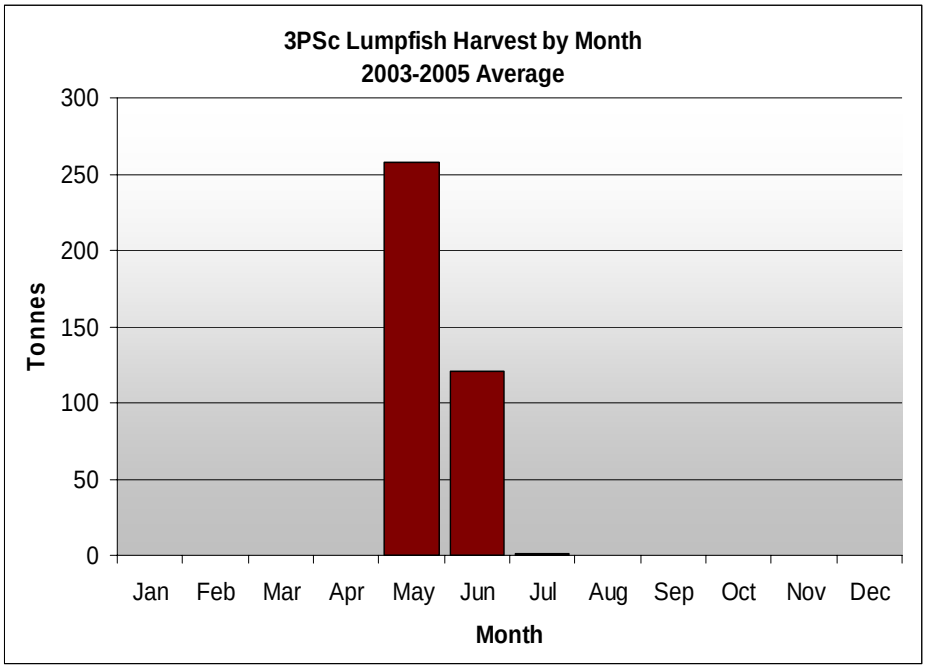


**Figure 7.13 UA 3PSc Lumpfish Harvest by Month**

### *Snow Crab*

This is an important fishery in 3PSc in terms of both quantity and value. While there has been an established crab fishery in this area since 1983, significant catches were not made until after 1985. In recent years, it has constituted 16 per cent by quantity and 34 per cent by value of the harvests (2003-05). Over the past few years, however, the Newfoundland and Labrador snow crab fishery has declined in both absolute and relative quantities and particularly in value as prices have fallen.

The most recent DFO status report notes that landings for Newfoundland and Labrador (2J, 3KLNOP, 4R) snow crab increased steadily from about 10,000 t annually during the late 1980s to 69,000 t in 1999, largely because of the expansion of the fishery in offshore areas. In 2000, landings decreased by 20 per cent to 55,400 t, increased slightly to 59,400 t in 2002 and 2003 and declined to 55,700 t in 2004 with changes in TACs. In 2005, the harvest decreased by 21 per cent to 43,900 t, primarily as the result of a drop in Division 3K landings where the TAC was not taken that year (historically, most of the snow crab landings have been from Divisions 3K and 3L) (DFO 2006b).

DFO (2006b) also observes that, "Negative relationships between bottom temperature and snow crab CPUE have been demonstrated at lags of six to 10 years, suggesting that cold conditions early in the life history are associated with the production of strong year classes. A warm oceanographic regime has persisted over the past decade implying poor long-term recruitment prospects."

The Snow Crab Fishing Areas (CFAs) off the Newfoundland south and eastern coasts are shown in Figure 7.14. The CFA 10A crab quota area (which is coincident with 3Psc, see Figure 7.1) is divided into two separate fishing zones: inside 12 nautical miles and outside 12 nautical miles. In the early 2000s, the inside IQs were harvested by about 277 participants, and the outside IQs by 121. (As is the case in several other quota areas, this inner and outer arrangement has been established to reduce fishing pressure in certain areas by spreading effort over a larger territory, particularly in the outer portion of the bay where crab appears to be more abundant.)

The Study Area crab fleet comprises about 400 participants, most of whom pursue this fishery in vessels <10.7 m within 10A. Until 2002, most of these fishers held temporary permits, which were converted to inshore crab licences in 2003. These fishers harvest their crab out to the boundary with CFA 10BC, at 46º30′N.

Crab are harvested extensively throughout Placentia Bay, including grounds within the Placentia Bay Routing System (PBRS). Fishers do not tend to harvest crab in specific areas or grounds within the bay, but rather wherever crab are to be found, though usually this is in fairly deep waters (>100-m depths). Nevertheless, harvesting activities tend to be concentrated in three general areas within Placentia Bay/3PSc: the middle portion of the outer reaches of the Bay, around the north and south ends of Merasheen Island, and on grounds relatively close to shore along the bottom of the Burin Peninsula, roughly between Little St. Lawrence and Point May.

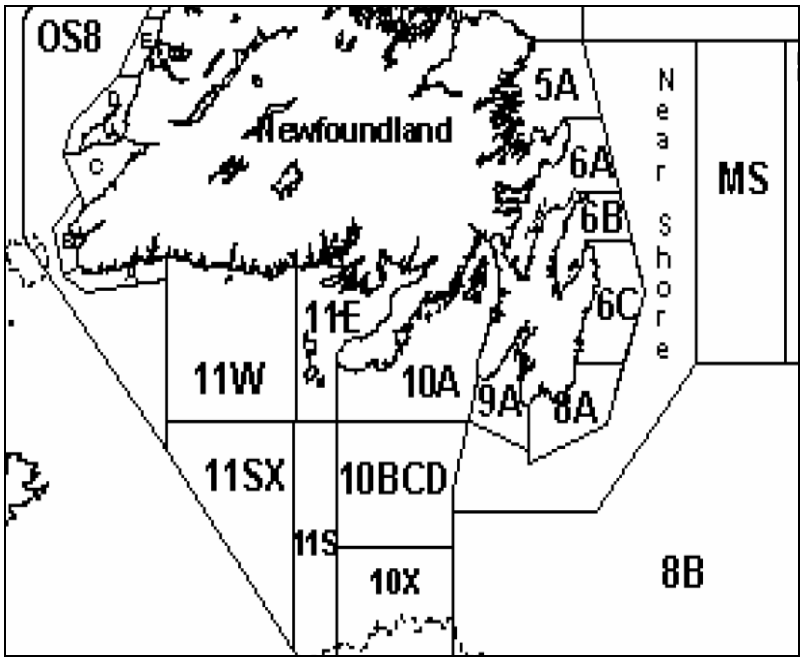


**Figure 7.14 Snow Crab Fishing Areas**

Figure 7.15 indicates the georeferenced snow crab harvest for 2003-05 (aggregated), which peaked in June. (Note, this does not include data recorded by vessels <10.7m).

The Fisheries Resource Conservation Council's *Strategic Conservation Framework for Atlantic Snow Crab* (FRCC 2005) recommended to the Minister of Fisheries and Oceans a variety of conservation measures as well as changes to the fishery's management structure. In March 2006, the minister announced that, owing to the uncertainty about future recruitment and the amount of exploitable biomass, as well as concerns about soft-shelled crab, new management measures would be introduced and others continued for the Newfoundland and Labrador snow crab fishery (DFO 2006c, BG-NL-06-01 and BG-NL-06-02, March 30, 2006). General measures include:

- Shortened fishing seasons in areas to provide additional protection during periods when the incidence of soft-shell crab is high;
- No season extensions; IQs are not a guarantee that the fisher will land that amount of crab;
- Enhanced soft-shell protocols;
- When areas are closed because of a high incidence of soft-shell crab, those areas will remain closed for the remainder of the year;
- Continue with increased observer coverage from 2005;
- In an effort to decrease the levels of wastage of soft-shell and undersized crabs being returned to the water, DFO will shorten fishing seasons and continue education programs with fishers on handling and discard practices; and
- TAC for 2006 was 46,233 t, reduced from 49,943 t in 2005.

In 3Ps, landings declined by 58 per cent from 7,600 t in 2002 to 3,200 t in 2005, while the TAC was reduced by 46 per cent. Effort increased by 59 per cent from 2001 to 2003 before decreasing by 29 per cent to 2005.

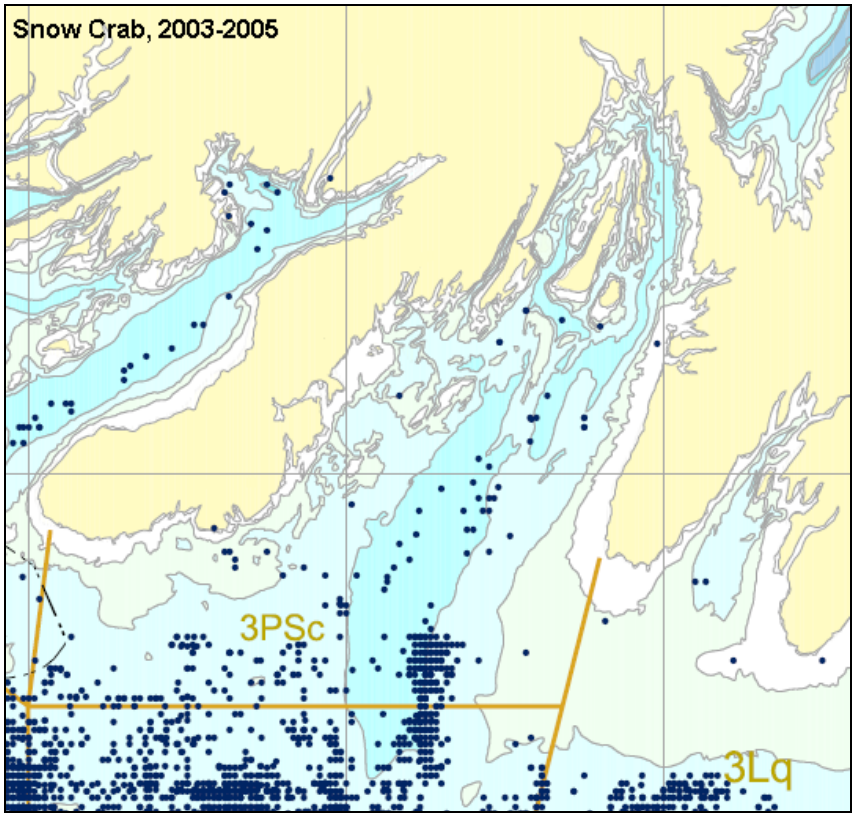


**Figure 7.15 Georeferenced Snow Crab Harvesting Locations, 2003 – 2005**

### *Lobster*

The lobster fishery made up less than 1 per cent of the 2003-05 3PSc harvest by quantity, but 6.6 per cent of its value. The fishery is managed by an integrated fisheries management plan (for 2003-05), and participants are restricted to fishing in the Lobster Fishing Area (LFA) in which they reside or have historically fished. Placentia Bay is in LFA 10 (Cape St. Mary's to Point Crewe). Other management and conservation measures include size limits, release of berried females, season limits, and a limited numbers of fishers and traps.

The lobster fishery harvest in the area occurs almost exclusively in May and June (See Figure 7.16). LFA 10 fishers are limited to 200 traps (pots) per licence.

The fishery is pursued close to shore in these areas, along rocky shorelines and nearshore islands, using small boats. The single, baited pots are hauled each day. The general practice is to set these pots along the shoreline in appropriate habitat for this species, in most cases in water depths <36 m.

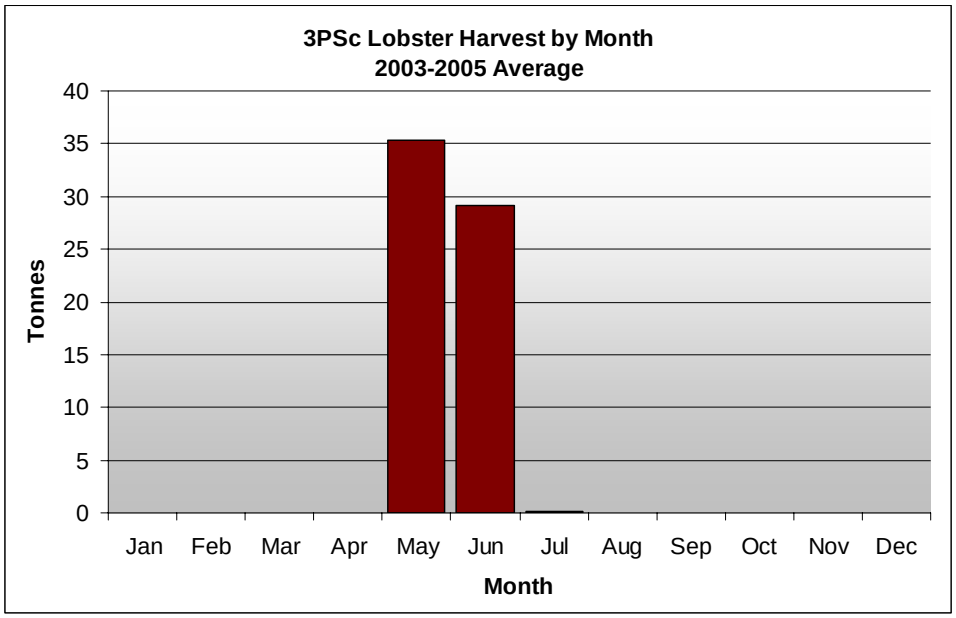


**Figure 7.16 UA 3PSc Lobster Harvest by Month**

### *Herring*

Herring accounted for nearly 9 per cent of the 3PSc harvest by quantity but just 1.4 per cent of its value (2003-05). On the south coast, it is harvested as a commercial fishery and for bait. The main gear used in 3PSc during this period was purse seines (85%), with smaller quantities harvested with bar seines and gillnets.

DFO's latest south coast herring Stock Status Report (2004-046) (DFO 2004) states that "documented effort increased from the 1980s to the 1990s. Purse seine effort (sets per fisher) peaked in 1997 and has since declined by 59 per cent from 1997 to 2004. Gill net effort (net nights fished per fisher) peaked in 1998 and has since declined by 94 per cent from 1998 to 2004."

That report notes that, in addition to annual reported landings for St. Mary's Bay-Placentia Bay, "an unknown amount of herring (considered to be less than 150 t) is caught in the gill-net bait fishery. The purse-seine fishery, in March 2004, was concentrated along the eastern sides of Placentia Bay and St. Mary's Bay. The 2004 spring gill-net fishery was mostly in Placentia Bay."

In recent years in Placentia Bay the reported landings have been made during the spring fishery (Figure 7.17).

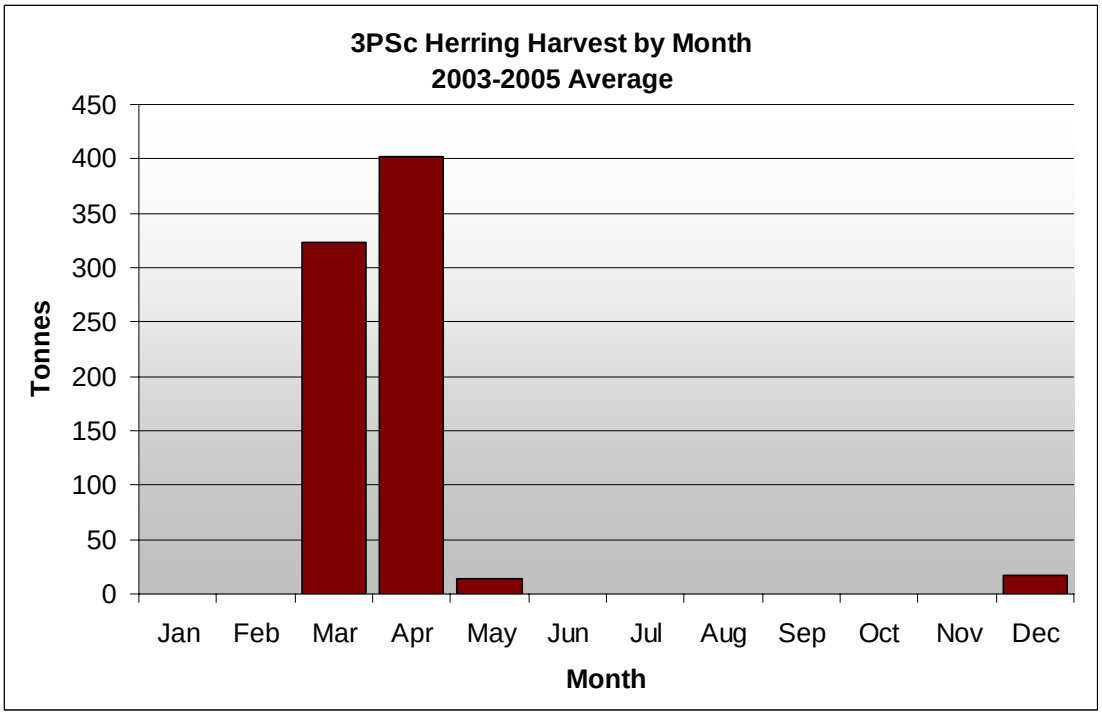


**Figure 7.17 UA 3PSc Herring Harvest by Month**

### 7.1.2 Aquaculture

The majority of the aquaculture development and investment activities in southern Newfoundland are concentrated in the Bay d'Espoir and Fortune Bay areas. The Province's aquaculture Strategic Plan notes "The Newfoundland salmonid industry is located in Bay d'Espoir, the only area of the Province that is suitable for the growing of steelhead trout and salmon" (Burke Consulting 2000). However, DFA aquaculture managers believe that Placentia Bay has many of the desirable characteristics of Bay d'Espoir, and are confident that it has significant growth opportunities, including possibilities for the development of salmon and rainbow trout farming, as well as further expansion of existing cod and mussel operations.

Aquaculture sites are located in inshore areas, usually in sheltered coves or along protected shorelines. Sites are typically chosen for the quality of the marine environment, and must consider a wide array of factors such as water temperatures, tides, bathymetry, benthic conditions, prevailing winds and currents, salinity, littoral factors and influences, proximity to other human activities such as commercial fishing, use of existing marine areas by pleasure craft, nearby shipping, other marine-oriented industries, community sewage outfalls, and access to services such as roads and electrical service. A potential site must also undergo a regulatory review and assessment of the physical setting and oceanographic conditions of the marine area proposed for the licence.

As a result, much time and money must be invested in an aquaculture operation even before it is established. Once in place and equipped, the operation must acquire "seed" stock and develop that stock and the business to a commercial size before it can establish its full income stream.

The development of aquaculture resources in Placentia Bay has been underway since about the mid-1990s. In 1997, there were about seven active aquaculture operations and several applications to investigate and/or develop additional sites. During 2000-03, DFA reported a relatively major level of expansion in the Placentia Bay aquaculture sector and a considerable interest in the development of new sites, particularly on the Burin Peninsula side of the bay and around Merasheen Island. During this period, DFA deployed thermographs in numerous locations to monitor water temperatures in order to assess whether such areas might be suitable for aquaculture.

By 2003 there were 15 approved aquaculture operations, including six blue mussel sites and nine cod grow-out facilities. As of 2004 there were still no full-cycle ("egg-to-plate") cod aquaculture operations in the province, and all cod enterprises were thus grow-out facilities. At that point, most of the cod farming sites were at a developmental stage, i.e., they had product in the water, but no significant amount of commercial sales. In 2004, DFA reported that only four operators were selling their product on a commercial basis; these included a cod farming facility at Jerseyman Island, three blue mussel sites within Long Harbour (at Crawley Island and St. Croix Bay), and two other mussel operations near Merasheen Island.

According to the most recent (April 2007) DFA data, there are 13 licenced aquaculture operations within Placentia Bay, five mussel farming operations and eight Atlantic cod grow-out sites. DFA is reviewing applications for an additional seven new mussel sites, and another currently-licenced operator has applied to add oyster farming activities to his existing mussel production site on Merasheen Island. Figure 7.18 shows the location of existing aquaculture activities in Placentia Bay, and Figure 7.19 shows the Long Harbour area specifically. Table 7.5 provides details about the operators and site locations. Of the 13 licenced aquaculture sites within the Study Area, only five are commercially active, and all of these are involved in mussel production. The eight remaining sites are (or once were) licenced for Atlantic cod, but none of these have had commercial sales since 2003. As of April 2007, two cod operators have renewed their licence, four licences have lapsed and the licence status of the remaining two is uncertain. Only one cod-farming site (at Jerseyman Island) still has equipment in the water, and the operator has plans to begin steelhead trout farming in 2008.

Consultations with Placentia Bay aquaculture licence holders (October 2006 and April 2007) indicate that cod farming has not proven economically feasible, and only one operator anticipates resuming his activities in the next year or two. Cod farmers report that a combination of factors – availability of growing stock, feed supply and costs, and market conditions – have made it very difficult to produce and sell farmed cod on an economic basis. One or two operators still remain optimistic that a special allocation of cod from DFO for grow-out stock might allow them to re-enter the aquaculture sector within the next few years. Despite this optimism, however, it will likely be some time before progress is

made in the farming of cod in Placentia Bay. DFA is presently reviewing the situation with respect to inactive sites and, for various reasons, many of the existing cod site licences will likely not be renewed.

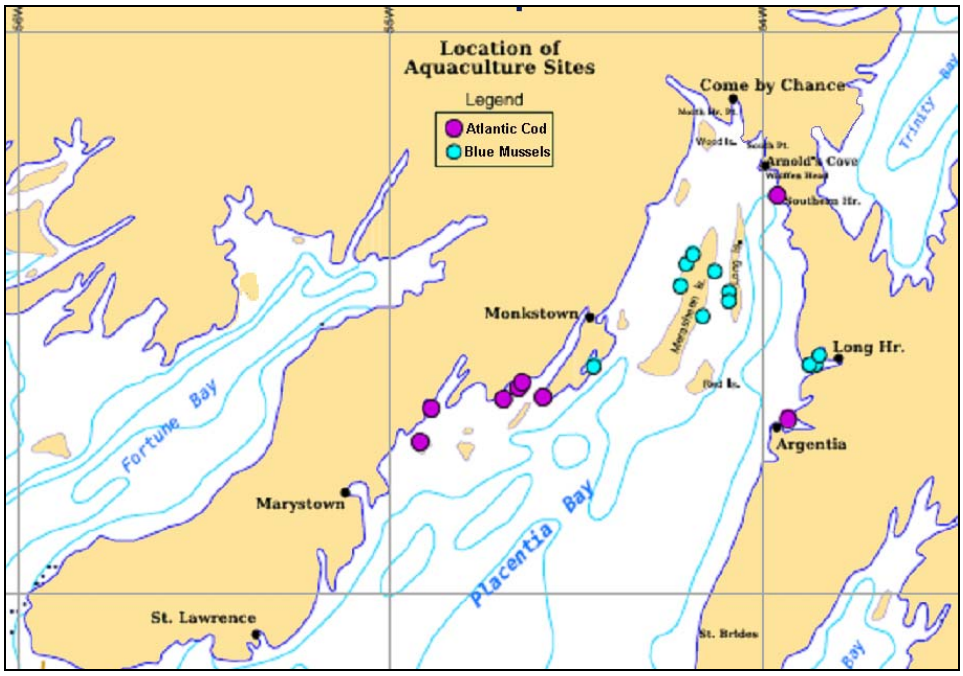


**Figure 7.18 Existing Aquaculture Sites in Placentia Bay (2007)**

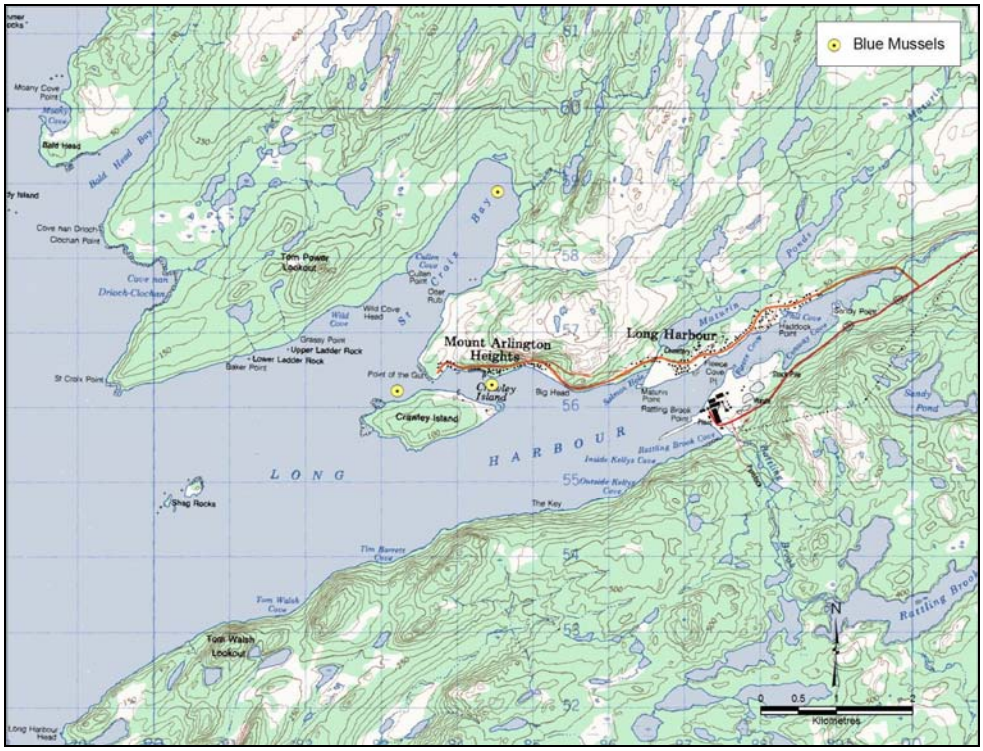


**Figure 7.19 Aquaculture Operations in the Long Harbour Area**

**Table 7.5 Placentia Bay Aquaculture Site Licenses and Applications, 2007**

| Company Name | Location | Latitude (Deg / Min) | | Longitude (Deg / Min) | | Species |
|---|---|---|---|---|---|---|
| **Licences** | | | | | | |
| Jones, Ambrose | Petite Forte | 47 | 23.4 | 54 | 39.99 | Atlantic Cod |
| Keating, Joseph (Baie Sea Farms) | Crawley Island, Long Harbour | 47 | 25.5 | 53 | 51.33 | Blue Mussels |
| Keating, Joseph (Baie Sea Farms) | Crawley Island, Long Harbour | 47 | 25.5 | 53 | 52.43 | Blue Mussels |
| Keating, Joseph (Baie Sea Farms) | St. Croix Bay | 47 | 26.8 | 53 | 51.57 | Blue Mussels |
| Leonard, Peter W. | Southern Harbour | 47 | 42.8 | 53 | 57.6 | Atlantic Cod |
| Moulton, Clayton | Flat Island Harbour | 47 | 16.12 | 54 | 55.15 | Atlantic Cod |
| Norman, Bernard | Jerseyman Island, Placentia Bay | 47 | 20.09 | 54 | 53.24 | Atlantic Cod |
| Pevie, Joseph and Pearson, Christopher | Woody Island (North Side) | 47 | 22.38 | 54 | 42.34 | Atlantic Cod |
| Pomeroy, Donald A. and Barry, John Jr. | Petite Forte Harbour | 47 | 24.06 | 54 | 39.49 | Atlantic Cod |
| Pomeroy, Donald A. and Barry, John Jr. | Gaultoin's Cove | 47 | 20.9 | 54 | 35.4 | Atlantic Cod |
| Sapphire Sea Farms Ltd. | Dunville, P. Bay | 47 | 15.9 | 53 | 55.11 | Atlantic Cod |
| Warren, Christopher J. | Big South West Cove, Merasheen I. | 47 | 34.43 | 54 | 10.35 | Blue Mussels |
| Warren, Christopher J. | Merasheen Island | 47 | 36.22 | 54 | 9.85 | Blue Mussels |
| **Applications** | | | | | | |
| Merasheen Mussel Farms | Jean de Gaunt | 47 | 32.9 | 54 | 14.17 | Blue Mussels |
| Merasheen Mussel Farms | Dog Harbour | 47 | 34.7 | 54 | 8.6 | Blue Mussels |
| Merasheen Mussel Farms | Rose au Rue | 47 | 30.1 | 54 | 10.86 | Blue Mussels |
| Merasheen Mussel Farms | Barren Island | 47 | 31.2 | 54 | 6.36 | Blue Mussels |
| Merasheen Mussel Farms | Presque Harbour | 47 | 24.8 | 54 | 29.17 | Blue Mussels |
| Warren, Christopher | Big South West (Expansion) | 47 | 34.43 | 54 | 10.35 | Blue Mussels |
| Mervin Hollett | Port Royal Arm | 47 | 32.3 | 54 | 5.55 | Blue Mussels |

**Source:** DFA, Newfoundland and Labrador (T. Budgell/Claudette Laing, DFA Grand Falls, April 2007).

### 7.1.3 Fish Processing

The locations of fish processing plants in Placentia Bay and area are shown in Figure 7.20 by category as of December 2003. The status (and ownership) of some of these plants is currently in flux.

Many of the plants in Placentia Bay receive a portion of their raw material inputs from fishing enterprises and suppliers from other areas. For example, FPI's Marystown facility has traditionally obtained over 90 per cent of its raw material inputs (primarily flatfish species) from offshore sources beyond Placentia Bay. Conversely, some fish harvested in the area goes to plants outside the area for processing.

Most of the species sold to processors and buyers are subsequently processed into a variety of final products and sold into various markets. Depending on its production costs, overhead structure and desired profit margin, a processing firm may be able to sell its final output for a higher price than another operator, or at a higher profit margin. Also, large quantities of lobster are purchased directly from fishers and then resold without having been processed. Hence, a significant portion of the final value of several species is not captured in local plant production figures.

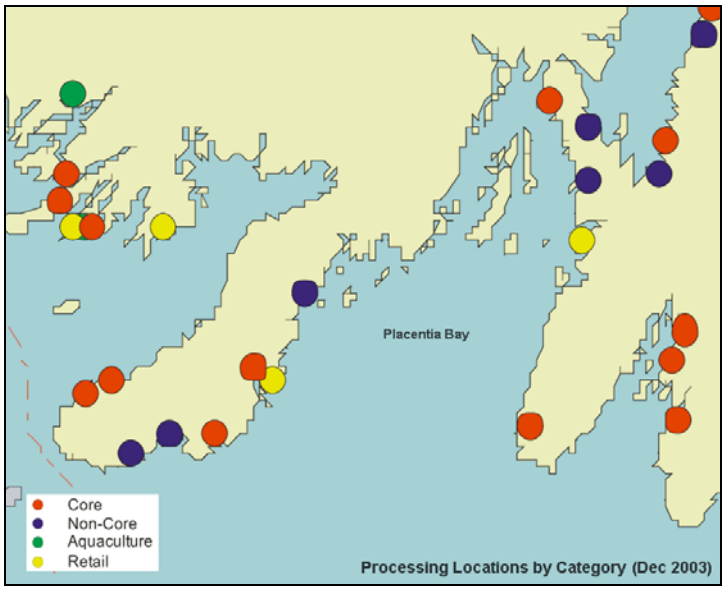


**Figure 7.20 Southern Newfoundland Fish Processing Licence Locations by Category (December 2003)**

**Source:** Dunne (2004).

### 7.1.4 Long Harbour Area Local Fisheries and Aquaculture

This section provides more detailed information about fisheries and fishing in the immediate vicinity of Long Harbour, based on consultations with area fishers and officials (LGL 2007).

#### Fishers and Vessels

In 2006, according to DFO licencing data, there were seven fishing enterprises with registered home ports in the Long Harbour-Mount Arlington Heights area, but one of these operators has since re-located to another home port. In 2006, based on fisher consultations, two enterprises operated longliners (one 13.7 m and one 10.7 m) and the remaining licence holders fished in speedboats (all less than 10.7 m). The largest vessel harvested most of its catch (crab and cod) in offshore fishing locations beyond 3Psc (based out of the port of St. Lawrence), while the other longliner operator fished crab within 3Psc/CFA 10A. The remaining smaller vessels fish a variety of species (cod, herring, mackerel, lobster, squid, blackback flounder and lumpfish) on inshore grounds within Long Harbour, as well as snow crab farther out in Placentia Bay, but within CFA 10A.

Fishers report that, in general, there is very little fishing activity within the immediate vicinity of the Port of Long Harbour. In previous years, quantities of squid, herring, lobster and mackerel were harvested close to the existing wharf, on both the north and south sides of this facility. Lobsters were once relatively abundant in this area, but fishers report that catches have decreased significantly in recent years, and very few mackerel or squid are now taken in these waters.

At least one fisher continues to harvest lobster on grounds in the vicinity of the Long Harbour wharf. He sets 15 to 20 pots close to shore adjacent to the old ERCO property, but he also noted that lobster are no longer plentiful there. He reports that 15 or 20 years ago, lobster were also taken well inside the inner, shallow portion of Long Harbour, as far in as Bottom Brook.

Herring were taken in significant quantities by bar seines a couple of years ago close to the wharf. Fishers report that there is a spawning area for herring in the shallow water in the inner part of Long Harbour between Pierce Cove Point and Bottom Brook Harbour. Herring are also taken by local fishers close to shore on the south side of Long Harbour from Rattling Brook Cove (on the south side of the wharf) out as far as Tim Barrett's Cove (located on the south side of Long Harbour, about halfway between the community and Long Harbour Head). This fishery generally lasts about two to three weeks. Local fishers, as well as larger vessels from St. Mary's Bay and other Placentia Bay ports, harvest herring around Crawley Island. These seining activities generally take place during March and April.

Cod are harvested using hand-lines and gillnets, though the latter is the preferred gear. Fishers report that no cod are harvested commercially in the immediate area of the community. Gillnetting areas for cod are concentrated between the east end of Crawley Island out to grounds located west of the Iona Islands and in suitable areas to the south as far as Fox Island. Most of these codfishing activities are located to the west of Shag Rocks, but at least one small-boat fisher prefers to harvest his cod on grounds inside these rocks, primarily because gillnets are generally set quite densely on the west side of Shag Rocks, and because it is easier for him to haul his nets in the shallower water to the east.

Lumpfish are harvested on grounds relatively close to shore near the community of Long Harbour, but one fisher also takes this species in shallow water to the east of Shag Rocks.

One fisher has fished scallops in St. Croix Bay in the past but reports they have not been very plentiful during the past eight to 10 years. For the most part, scallops are no longer fished on a commercial basis, although they are still taken occasionally by divers.

An anchorage area within Long Harbour area was established three or four years ago and is sometimes used by small tankers visiting the Come by Chance Refinery. This anchorage is located in the outer middle portion of Long Harbour, between Shag Rocks and Burke Island/Merchant Island. Some local fishers harvest cod and other species within this anchorage location. CCG reports this official anchorage, Anchorage "FF", is used for vessels with a draft of less than 12 m. The anchorage is located at 47°24'30"N and 53°56'18"W (H. Burge, pers comm., October 2006).

## Aquaculture Operations

There are three blue mussel farming sites within Long Harbour. Two of these are located on the north side of Crawley Island and the other within St. Croix Bay (see Figure 7.19 and Table 7.5). All three sites are owned and operated by Baie Sea Farms and have been under active development since the late 1980s.

### 7.1.5 Summary

In recent years (2003-05 data), the most important (in order of total mean landings) commercial species in 3PSc, which includes much of Placentia Bay, included Atlantic cod, snow crab, herring, lumpfish (roe), scallops and a few other species. Cod, snow crab, lumpfish and lobster account for 90 per cent of fishers' income. American lobster accounts for less than 1 per cent of the catch, but almost 7 per cent of total value. Herring has indirect economic importance in the area as bait. Most of the gear used is fixed (i.e., gillnets, longlines, traps and pots), although some purse-seining is used to catch herring. Fishing in the immediate vicinity of Long Harbour is generally limited to lobster (15-20 pots), herring and lumpfish. The scale of aquaculture (mostly blue mussels) is relatively small; however, DFA feels that Placentia Bay has significant growth potential.

## 7.2 Boundaries

Boundaries for the Commercial Fisheries and Aquaculture VEC are defined in Section 4.0 of Volume 2.

## 7.3 Impact Significance Criteria

Assessment criteria for this VEC are described in Section 4.0 of Volume 2.

Significant environmental effects are those that are considered to be of sufficient magnitude, duration, frequency, geographic extent and/or reversibility to cause a change in the commercial fisheries and aquaculture VEC, that will altering its status or integrity beyond an acceptable level. Establishment of the criteria is based on professional judgment, but is transparent and repeatable. In this EIS, a *significant* effect is defined as:

> *Having a high magnitude or medium magnitude for a duration of greater than one year and over a geographic extent greater than 100 km$^2$.*

An effect can be considered *significant*, *not significant*, or *positive*.

## 7.4 Potential Interactions

The commercial fisheries and aquaculture VEC could potentially interact with a variety of routine activities associated with Construction, Operations, and Decommissioning. Some routine activities of concern include vessel traffic, marine construction resulting in exclusion zones, and noise. The potential interactions and the assessment of the effects of these interactions and others are presented in more detail in Sections 7.6 to 7.8.

## 7.5 Issues and Concerns

Consultations with fishing interests in Long Harbour Bay and other parts of Placentia Bay helped identify potential issues and concerns associated with the Project. For commercial wild fisheries, the concerns are: the process of accessing and returning from fishing grounds, the use of the grounds, the deployment and integrity of fishing gear and related equipment, the success of the harvesting activities (catch rates) and the marketability of the catch.

For aquaculture operators, concerns include: the condition and integrity of aquaculture gear, facilities and related equipment; the ability to seed, tend and harvest the stock; the marketability of the fish to upstream buyers; and the future economic viability of the operation.

For fish processors, the primary concern is security of supply of raw material.

## 7.6 Effects of Construction Activities

This section assesses potential effects of Construction activities on the industrial and economic aspects of the commercial fisheries and aquaculture VEC. Table 7.6 indicates the potential interactions between Construction Phase activities and the commercial fisheries and aquaculture VEC. The assessments that follow discuss only the identified interactions.

**Table 7.6 Potential Interactions between Construction Activities and Commercial Fisheries and Aquaculture VEC**

| Valued Ecosystem Component: Commercial Fisheries and Aquaculture | | | |
|---|---|---|---|
| | **Wild** | **Aquaculture** | **Processing** |
| **Construction Activities and Physical Works** | | | |
| Earthworks | | | |
| Wharf expansion and dredging | ✓ | | ✓ |
| Blasting | | | |
| Effluent pipeline | | | |
| Atmospheric emissions (incl. dust) | | | |
| Roads | | | |
| Storm system | | | |
| Sewage system | | | |
| Pipelines | | | |
| Water supply dam | | | |
| Residue storage dams | | | |
| Power lines | | | |
| Ships and boats | ✓ | | ✓ |
| Vehicle traffic | | | |
| Sewage | | | |
| Solid waste/Construction debris | ✓ | ✓ | ✓ |
| Temporary power | | | |
| Lighting | | | |
| Noise | ✓ | | ✓ |

### 7.6.1 Wharf Expansion and Dredging

The temporary exclusion of fishing from within the marine construction area because of work during wharf expansion, dredging, and related activities could have *negative* effects on both the commercial wild fisheries and processing components of this VEC.

Before the start of marine construction activities, Vale Inco NL will establish a Construction Safety Zone (CSZ) in the work area. For safety reasons, and to allow marine construction activities to take place in an efficient and timely manner, the CSZ will be closed to all fishing activities and fishing vessel transits, at least until the wharf expansion is finished.

While the area encompassed by the CSZ represents only a small proportion of the fishing grounds in Long Harbour Bay or Placentia Bay, for some of the fishers operating in the vicinity of the Port of Long Harbour, the presence of this zone may represent the temporary loss of some harvestable lobster grounds.

Wharf expansion and dredging could potentially have *negative* effects on the wild commercial fisheries and processing.

**Mitigation**

Before the start of Construction and following Project approval, Vale Inco NL will initiate a process to facilitate fisheries-industry consultation on all aspects of the marine facilities Construction Phase as they relate to established fisheries and aquaculture operations. A Project Fisheries and Aquaculture Liaison Committee (FALC) will be established for this purpose. The FALC will include individual area fishers and the aquaculture operator; this will help ensure that potential negative effects are addressed and avoided or reduced.

The CSZ for the wharf expansion will be clearly marked with buoys. To reduce the effects on fishing activities, Vale Inco NL will restrict the size of the area to be set aside for a CSZ to allow as much use of the established grounds in the vicinity of the construction area as possible (within the constraints of safety).

Vale Inco NL will also establish a Fisheries and Aquaculture Compensation Program (FACP) for any fishers who might experience actual economic loss resulting from construction activities. This Program will be developed in consultation with area fishers and the aquaculture facility operator, and with FFAW representation if they choose to participate.

Covered losses will include those resulting from the temporary exclusion from usual harvesting areas, interference with fish harvesting activities, and lost fishing opportunity within the CSZ during Construction. It will also cover losses that might result from damage due to Project-related debris,

and/or damage to gear and equipment caused by project vessels operating outside designated vessel traffic areas.

Vale Inco NL will work with relevant fishers and the aquaculture operator on the principles, components, and eligibility criteria for the Program with the aim of establishing an agreement before the commencement of marine Construction activities.

The Program principles and components will be developed to be consistent with other such programs that have been established for similar kinds of marine projects in Atlantic Canada. The following are principles that Vale Inco NL would apply to the development of a program for the Long Harbour area.

- The compensation program should protect the fishing/aquaculture incomes of all industry participants actually affected by Project activities to the extent that they are so affected.
- Within the constraints of safety and those imposed by Project activities, the Program should provide an operating environment which allows and encourages the continuation of normal levels of fishing/aquaculture effort. It should also allow the Project to proceed on its planned schedule.
- As a result of Project activities, fishers should be no worse or better off than they were before the start of the Project. The purpose of a compensation program is to make up the full extent of any loss of harvesting efficiency and fishing income, but it is not intended to provide a new income opportunity.
- The Program should be equitable and fair to all those involved, while recognizing that individual fishers may have used the resources in the affected area differently and to varying degrees (e.g. differences in fishing berth location, differences in income, different licence portfolios).
- The Program should be designed to avoid or minimize any increased pressure on fisheries or fishing grounds which might already be at maximum levels of exploitation. As such, the Program will aim to be in harmony with, and mutually supportive of, the basic goals and principles of resource conservation and integrated management.
- The Program should be for those who have historically and usually fished in the waters of and adjacent to the affected Project area. In general, the Program will recognize that fishers and aquaculture operators located nearest the affected Project area will need the greatest level of protection.

**Assessment**

With the described mitigations in place, the predicted magnitude, geographic extent, and duration of the residual reversible effects of wharf expansion and dredging on the commercial fisheries and aquaculture VEC are predicted to be *negligible*, *1 to 10 km$^2$,* and *1 to 12 months*, respectively (Table 7.7). The residual effects on commercial fisheries and aquaculture VEC are *not significant* (Table 7.8).

## Table 7.7 Effects Assessment of Construction Activities on Commercial Fisheries and Aquaculture VEC

| Valued Ecosystem Component: Commercial Fisheries and Aquaculture | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Project Activity** | **Potential Positive (P) or Negative (N) Environmental Effect** | **Mitigation** | **Evaluation Criteria for Assessing Environmental Effects** | | | | | |
| | | | **Magnitude** | **Geographic Extent** | **Frequency** | **Duration** | **Reversibility** | **Ecological/ Socio-Cultural and Economic Context** |
| **Construction Activities and Physical Works** | | | | | | | | |
| Wharf expansion (piling installation) and dredging | Loss of traditional grounds (N) | Minimize footprint; FACP | 0 | 2 | 1 | 2 | R | 2 |
| Shipping | Interference with fishing; gear damage (N) | CSZ; VTMP; FACP gear compensation plan | 1 | 2 | 4 | 4 | R | 2 |
| Solid waste/ Construction debris | Gear damage (N) | CSZ; containment; FACP gear compensation plan | 0 | 3 | 1 | 4 | R | 2 |
| Noise | Disturbance (N) | Distance from fishing/aquaculture; minimization of noise level | 1 | 2 | 6 | 4 | R | 2 |

**Key:**

Magnitude:
0 = Negligible, essentially no effect
1 = Low
2 = Medium
3 = High

Geographic Extent:
1 = < 1 $km^2$
2 = 1-10 $km^2$
3 = 11-100 $km^2$
4 = 101-1000 $km^2$
5 = 1001-10,000 $km^2$
6 = > 10,000 $km^2$

Frequency:
1 = < 11 events/yr
2 = 11-50 events/yr
3 = 51-100 events/yr
4 = 101-200 events/yr
5 = > 200 events/yr
6 = continuous

Ecological/Socio-cultural and Economic Context:
1 = Relatively pristine area or area not adversely affected by human activity
2 = Evidence of existing adverse effects

*N/A = Not Applicable

Reversibility:
R = Reversible
I = Irreversible
(refers to population)

Duration:
1 = < 1 month
2 = 1-12 months
3 = 13-36 months
4 = 37-72 months
5 = > 72 months

### 7.6.2 Shipping

During the Construction Phase, up to three vessels (barges or ships) per month are expected to deliver material to the site. These vessels could potentially transit through and damage fixed fishing gear. Any mobile gear should not be an issue as fishing vessels and Project vessels should be aware of each other. Construction-related vessels could cause interference with fishing boats en route to or from their regular fishing grounds within Long Harbour or to other locations within Placentia Bay. Avoiding routes used by Project vessels could result in longer transit times and increased expenses. There could be increased safety risks for some fishers in the vicinity of construction activities in Long Harbour. Ships and boats could potentially have *negative* effects on wild commercial fisheries and processing.

## Mitigation

The CSZ will contain most of the marine activity associated with construction. There should be relatively little traffic outside these areas. This will also provide a level of certainty to fishers planning transits and serve to increase safety.

The CSZ will also reduce likelihood of gear conflict and damage. Fishers will be aware of the location of the CSZ; construction activities will occur within the CSZ to the greatest extent possible, and operators of work vessels will be informed about fishing activities and locations in the immediate area.

Prior to the start of marine construction activities, Vale Inco NL will consult with local fishers (using the FALC described above) to discuss and agree on an appropriate Vessel Traffic Management Plan (VTMP) for the safe and efficient operation of construction-related marine traffic and fishing vessel operations within Long Harbour. The VTMP will document information about all fishing vessel transits and harvesting operations along the route between the Vessel Traffic Separation Scheme (VTSS), the entrance to and through Long Harbour to marine construction operations within the Port of Long Harbour, and will establish protocols and procedures to reduce interference between construction-related vessel traffic and fishing operations.

The VTMP will be similar in scope and content to vessel management plans developed for other marine construction projects in the area, such as those prepared in the 1990s for the Hibernia GBS construction project at Bull Arm, Trinity Bay, and for the Newfoundland Transshipment Terminal at Whiffen Head.

Vale Inco NL will establish a policy to address damage to fishing and aquaculture gear, equipment or vessels resulting from Project vessels or debris. The policy will also address lost catch, or lost aquaculture product sales, directly as a result of such damage or loss. The policy will be similar to those currently operating within the offshore area. The purpose will be to provide fair and timely settlement of claims.

As noted above, the FACP will be developed to cover any losses that might result from damage due to Project-related debris and/or damage to gear and equipment caused by Project vessel traffic areas, defined in the VTMP. This will also address lost catch, or lost aquaculture product sales, directly as a result of such damage or loss.

## Assessment

With the described mitigations in place, the predicted magnitude, geographic extent and duration of the residual *reversible* effects of ships and boats on the commercial fisheries and aquaculture VEC are predicted to be *low*, *1 to 10 km$^2$*, and *37 to 72 months*, respectively (Table 7.7). The residual effects of ships and boats on the commercial fisheries and aquaculture VEC are *not significant* (Table 7.8)

**Table 7.8 Significance of Potential Residual Environmental Effects of Construction Activities on Commercial Fisheries and Aquaculture VEC**

| Valued Ecosystem Component: Commercial Fisheries and Aquaculture | | | | |
|---|---|---|---|---|
| | **Significance Rating** | **Level of Confidence** | **Likelihood[a]** | |
| **Project Activity** | **Significance of Predicted Residual Environmental Effects** | | **Probability of Occurrence** | **Scientific Certainty** |
| **Construction Activities and Physical Works** | | | | |
| Wharf expansion (piling installation) and dredging | NS | 3 | - | - |
| Shipping | NS | 3 | - | - |
| Solid waste/ Construction debris | NS | 3 | - | - |
| Noise | NS | 3 | - | - |

**Key:**

Residual environmental Effect Rating:
S = Significant Adverse Environmental Effect
NS = Not-significant Adverse Environmental Effect
P = Positive Environmental Effect

Significance is defined as a medium or high magnitude (2 or 3 rating) and duration greater than 1 year (3 or greater rating) and geographic extent >100 km$^2$ (4 or greater rating).

Level of Confidence: based on professional judgment:
1 = Low Level of Confidence
2 = Medium Level of Confidence
3 = High Level of Confidence

Probability of Occurrence: based on professional judgment:
1 = Low Probability of Occurrence
2 = Medium Probability of Occurrence
3 = High Probability of Occurrence

Scientific Certainty: based on scientific information and statistical analysis or professional judgment:
1 = Low Level of Confidence
2 = Medium Level of Confidence
3 = High Level of Confidence
N/A = Not Applicable

[a] Only applicable to significant effect

### 7.6.3 Solid Waste/Construction Debris

Debris associated with construction activities could potentially float into fixed gear and damage it. This could potentially have *negative* effects on wild commercial fisheries, aquaculture and processing.

#### Mitigation

Appropriate precautions will be taken during construction to prevent the release of debris from onshore and marine sites. Vale Inco NL will establish a compensation policy to address damage to fishing gear, equipment or vessels resulting from an interaction with Project-related marine activities.

#### Assessment

With the described mitigations in place, the predicted magnitude, geographic extent and duration of the residual reversible effects of solid waste and construction debris on the commercial fisheries and aquaculture VEC are predicted to be *negligible*, *11 to 100 km$^2$*, and *37 to 72 months*, respectively (Table 7.7). The residual effects of solid waste and construction debris on the commercial fisheries and aquaculture VEC are *not significant* (Table 7.8).

### 7.6.4 Noise

Some dredging in the area of the existing wharf will be carried out to remove infill sediment and some scrap steel to ensure the safe docking of Project vessels. No marine blasting has been planned. All dredging activities will be carried out, and dredge materials placed on land, in accordance with regulatory requirements.

These marine construction activities will create some sound in and near the water. Very loud noise in the marine environment can scare fish (particularly finfish) away from their usual grounds, or make them less catchable. Similar effects are not usually documented for benthic invertebrates (such as lobster and crab); see for instance Christian et al. (2003); Parry and Gason (2006). However, fishers report that there is relatively little fishing activity within the immediate vicinity of the Port of Long Harbour.

At any given time, there will likely be no more than two vessels operating concurrently on the marine wharf. Ships noises associated with construction are not expected to be different from those usually associated with other vessels in the bay, such as fishing boats and those of other marine industries.

Noise created by Construction Phase routine activities could potentially have *negative* effects on wild commercial fisheries and processing.

**Mitigation**

As described above, a CSZ will be established in consultation with fishers to reduce the effects of Construction on fishing and to enhance safety. Since the construction noise will be connected with activities within this safety area, there will be a sound attenuation buffer between activities and active fishing. If the noise were to divert fish from this area, fishing beyond the zone might improve as fish densities rose – although no effect is predicted.

**Assessment**

With the described mitigations in place, the predicted magnitude, geographic extent and duration of the residual *reversible* effects of Construction Phase noise on the commercial fisheries and aquaculture VEC are predicted to be *low*, *1 to 10 km$^2$*, and *37 to 72 months*, respectively (Table 7.7). The residual effects of noise on the commercial fisheries and aquaculture VEC are *not significant* (Table 7.8).

## 7.7 Effects of Operations Activities

This section assesses potential effects of Operational activities on the industrial and economic aspects of the commercial fisheries and aquaculture VEC. Table 7.9 indicates the potential interactions between Operations Phase activities and the commercial fisheries and aquaculture VEC. The assessments that follow discuss only those interactions indicated in Table 7.9. Considering the location of activities vis-à-vis present aquaculture operations, no potential interactions are expected as a result of operational

activities. There are no aquaculture sites within the physical or operational footprint of the processing plant's marine facilities.

**Table 7.9 Potential Interactions between Operational Activities and Commercial Fisheries and Aquaculture VEC**

| Valued Ecosystem Component: Commercial Fisheries and Aquaculture | | | |
|---|---|---|---|
| | **Wild** | **Aquaculture** | **Processing** |
| **Operational Activities and Physical Works** | | | |
| Total footprint | ✓ | | ✓ |
| Residue storage | | | |
| Shipping | ✓ | | ✓ |
| Water use | | | |
| Electricity use | | | |
| Diesel use | | | |
| Fuel Oil#2 use | | | |
| Atmospheric emissions (incl. dust) | | | |
| Marine effluent | | | |
| Site runoff | | | |
| Surge pond | | | |
| Sewage | | | |
| Solid waste | | | |
| Vehicle traffic | | | |
| Washdowns | | | |
| Noise | ✓ | | ✓ |
| Lighting | | | |
| Maintenance | | | |

### 7.7.1 Project Footprint

During the Operations Phase, a small portion of existing lobster grounds close to the Long Harbour wharf will be lost due to the presence of new marine infrastructure. As noted above, at least one fisher currently harvests part of his lobster catch in the vicinity of the existing wharf. It is anticipated that the seabed area covered by the marine effluent pipeline will remain open to fish harvesting activities. No aquaculture lease areas will be affected by the presence of the Project's permanent infrastructure.

Project-related vessels will be accommodated at the expanded wharf at Long Harbour. Therefore, during the Operations Phase, Project-related vessels will not be using the designated anchorage area within Long Harbour.

The total footprint has potential to cause temporary *negative* effects on the wild commercial fisheries and processing.

### Mitigation

The Project will actually enhance existing lobster habitat in the area of the permanent marine facilities (i.e., the expanded wharf). Vale Inco NL will install armour stone along parts of the shoreline to protect it from erosion, and this is expected to improve the habitat for commercial species, particularly lobster.

Once the marine facilities are completed, lobster fishing will be re-opened. Lobster fishers who have traditionally set their gear in this area could resume their harvesting activities at the start of the next season. This will help to ensure that the amount of the established fishing area lost to permanent facilities will be kept to a minimum.

Although it is not expected that the presence of permanent infrastructure (expanded wharf and marine effluent pipeline) will result in economic loss to fishers or aquaculturalists, potential impacts resulting from these permanent facilities will be considered in the discussions related to the development of the FACP, described above. The issue of direct effects on the marketability of aquaculture products will be included in this discussion.

### Assessment

With the described mitigations in place, the predicted magnitude, geographic extent and duration of the residual *reversible* effects of the Operations Phase total footprint on the commercial fisheries and aquaculture VEC are predicted to be *negligible*, *1 to 10 km$^2$*, and *>72 months*, respectively (Table 7.10). The residual effects of the total footprint on the commercial fisheries and aquaculture VEC are *not significant* (Table 7.11).

## 7.7.2 Shipping

It is expected that all Project vessels will enter and leave Placentia Bay via the designated traffic lanes. Traffic is estimated at 25 vessels per year.

Placentia Bay is within the Placentia Bay Vessel Traffic Services (VTS) Zone, and all ships 20 m or longer are managed under Vessel Traffic Services Zone Regulations under the *Canadian Shipping Act* as administered in the area by the Canadian Coast Guard, who also maintain a Marine Communications and Traffic Services facility at Argentia. Participation in the Placentia Bay VTS system will be mandatory for all Vale Inco NL vessels arriving at or departing from the Port of Long Harbour, and it is anticipated that all Project vessels will be equipped with AIS (Automatic Identification System) technology.

The Placentia Bay Traffic Separation Scheme extends from the southern limit of Placentia Bay to just below Red Island, and a two-way route exists for vessel traffic from Red Island north to about Arnold's Cove, at the head of Placentia Bay. During operations, all Vale Inco NL vessels approaching and

departing from the Long Harbour wharf will use these traffic schemes. Consultations with CCG indicate that the routes (traffic lanes) have sufficient capacity for all anticipated Project traffic.

Project shipping, including tugs and other support vessels, could transit through and make contact with fixed fishing gear. This could have an adverse effect on wild fisheries if gear is damaged or lost. Mobile gear is not expected to be an issue because any fishing boats with such equipment and Vale Inco NL vessels should be aware of each other.

Ships will have minimal n*egative* effects on the wild commercial fisheries and processing.

**Mitigation**

Vale Inco NL will continue consultations and communications with fisheries and aquaculture participants about vessel traffic and other marine issues and will seek advice and input on relevant aspects of Project operations as they relate to commercial fisheries and aquaculture activities within Long Harbour Bay. This will help ensure that potential negative interactions are identified and addressed. In particular, the FLC will be consulted during this process.

All processing plant-related marine traffic (greater than 20 m) will participate in the VTS Zone and follow Zone regulations. When in the areas serviced by the TSS, all vessels will remain within these lanes to reduce potential interference. The location of these lanes and the procedures and protocols all vessels are required to follow are well known to most fish harvesters.

Vale Inco NL will work with local fishers to establish voluntary traffic management procedures for the Long Harbour area, including the approaches to this area. Among other traffic-related protocols, these procedures will include: designating appropriate routes to be followed by all incoming and outgoing Project vessels, the placement of any buoys and/or vector lights required to mark this route, and the basic "rules of the road" to be followed by all Project vessels operating within this marine area. While the primary purpose of these procedures is the safe and efficient management of all Project vessels, they will also be designed to ensure the safety of fishers, to prevent gear and vessel damage or loss, and to prevent or reduce interference with normal fishing activities by restricting the area of potential interference. These procedures will provide an operating environment within Long Harbour and its approaches that allows and encourages the continuation of normal levels of fishing effort and fishing vessel traffic within the area.

Vale Inco NL will designate one of its production personnel (e.g., from Port Operations) to act as a marine traffic manager, whose primary responsibility will be to oversee and manage interactions between Project vessels and fishing vessel traffic operating in Long Harbour. This manager will maintain communications between Project marine traffic operations and fishing vessel operators in order to address interactions and interference.

The Compensation Program, described above, will also cover any losses during the Operational Phase that might result from damage due to Project-related debris, and/or damage to gear and equipment caused by Project vessels operating outside designated vessel traffic areas, defined in the VTMP. This would include situations where Project vessels might travel outside the agreed route due to weather or emergencies.

## Assessment

With the described mitigations in place, the predicted magnitude, geographic extent and duration of the residual *reversible* effects of the Operations Phase ships on the commercial fisheries and aquaculture VEC are predicted to be *low*, *11 to 100 km$^2$*, and *>72 months*, respectively (Table 7.10). The residual effects of ships on the commercial fisheries and aquaculture VEC are *not significant* (Table 7.11).

### Table 7.10 Effects Assessment of Operational Activities on Commercial Fisheries and Aquaculture VEC

| Valued Ecosystem Component: Commercial Fisheries and Aquaculture | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Project Activity** | **Potential Positive (P) or Negative (N) Environmental Effect** | **Mitigation** | **Evaluation Criteria for Assessing Environmental Effects** | | | | | |
| | | | **Magnitude** | **Geographic Extent** | **Frequency** | **Duration** | **Reversibility** | **Ecological/ Socio-Cultural and Economic Context** |
| **Operational Activities and Physical Works** | | | | | | | | |
| Total footprint | Loss of traditional grounds (N)<br><br>Increased amount of fish habitat (P) | Return of access to lobster grounds in wharf area | 0 | 2 | 6 | 5 | R | 2 |
| Shipping | Interference with fishing; gear damage (N) | | 1 | 3 | 5 | 5 | R | 2 |
| Noise | Disturbance (N) | | 0-1 | 2 | 5 | 5 | R | 2 |

**Key:**

Magnitude:
0 = Negligible, essentially no effect
1 = Low
2 = Medium
3 = High

Geographic Extent:
1 = < 1 km$^2$
2 = 1-10 km$^2$
3 = 11-100 km$^2$
4 = 101-1000 km$^2$
5 = 1001-10,000 km$^2$
6 = > 10,000 km$^2$

1 = < 11 events/yr
2 = 11-50 events/yr
3 = 51-100 events/yr
4 = 101-200 events/yr
5 = > 200 events/yr
6 = continuous

R = Reversible
I = Irreversible
(refers to population)

1 = < 1 month
2 = 1-12 months
3 = 13-36 months
4 = 37-72 months
5 = > 72 months

Ecological/Socio-cultural and Economic Context:
1 = Relatively pristine area or area not adversely affected by human activity
2 = Evidence of existing adverse effects

*N/A = Not Applicable

**Table 7.11 Significance of Potential Residual Environmental Effects of Operational Activities on Commercial Fisheries and Aquaculture VEC**

| Valued Ecosystem Component: Commercial Fisheries and Aquaculture | | | | |
|---|---|---|---|---|
| | **Significance Rating** | **Level of Confidence** | **Likelihood[a]** | |
| **Project Activity** | **Significance of Predicted Residual Environmental Effects** | | **Probability of Occurrence** | **Scientific Certainty** |
| **Operational Activities and Physical Works** | | | | |
| Total footprint | NS | 3 | - | - |
| Shipping | NS | 3 | - | - |
| Noise | NS | 3 | - | - |

**Key:**

Residual environmental Effect Rating:
S = Significant Adverse Environmental Effect
NS = Not-significant Adverse Environmental Effect
P = Positive Environmental Effect

Significance is defined as a medium or high magnitude (2 or 3 rating) and duration greater than 1 year (3 or greater rating) and geographic extent >100 $km^2$ (4 or greater rating).

Level of Confidence: based on professional judgment:
1 = Low Level of Confidence
2 = Medium Level of Confidence
3 = High Level of Confidence

Probability of Occurrence: based on professional judgment:
1 = Low Probability of Occurrence
2 = Medium Probability of Occurrence
3 = High Probability of Occurrence

Scientific Certainty: based on scientific information and statistical analysis or professional judgment:
1 = Low Level of Confidence
2 = Medium Level of Confidence
3 = High Level of Confidence
N/A = Not Applicable

[a] Only applicable to significant effect.

### 7.7.3 Noise

The issue of concern is the potential for noise from Project-related shipping scaring finfish from harvesting areas, or away from active fishing gear. This would not be expected to be the case for benthic invertebrates such as lobster and crab, as discussed in the Construction Phase part of this assessment.

The noise from ships associated with Operations are not expected to be different from those usually associated with other vessels operating within Placentia Bay, such as fishing boats and other marine industry vessels. Research studies have not documented any measurable reductions in fishing success due to vessel noise.

Noise may have minimal n*egative* effects on the wild commercial fisheries and processing.

**Mitigation**

No mitigation is required, but the containment of Project vessel traffic within agreed routes away from fishing will reduce or eliminate the potential for any interaction.

**Assessment**

The magnitude, geographic extent and duration of the residual *reversible* effects of the Operations Phase noise on the commercial fisheries and aquaculture VEC are predicted to be *negligible to low*, *1 to 10 km$^2$,* and *>72 months*, respectively (Table 7.10). The residual effects of Operations Phase noise on the commercial fisheries and aquaculture VEC are *not significant* (Table 7.11).

## 7.8 Effects of Decommissioning

Considering the predicted lack of *significant* effects of the routine activities of both Construction and Operations Phases, the residual effects of decommissioning routine activities on the commercial fisheries and aquaculture VEC are predicted to be *not significant*.

## 7.9 Cumulative Effects

Discussion in this section focuses primarily on the potential cumulative effects on established commercial fish harvesting activities during both the Construction and Operations Phases of the Vale Inco NL Project in Long Harbour.

Project Construction and Operations will not have any cumulative effects on existing aquaculture operations within Long Harbour, or on aquaculture activities elsewhere in Placentia Bay, as there are no other aquaculture sites located within the bay in the area south of Long Harbour.

Project Construction and Operations will not have any cumulative effects on Placentia Bay fish processing operations other than those that might be the result of any cumulative effects on the commercial fisheries.

These anticipated cumulative effects on the fisheries will be associated with increases in large vessel traffic within Placentia Bay. Project-related vessel traffic, as well as traffic generated by other existing or proposed projects, have the potential to interfere with established harvesting and fishing vessel activities within the Traffic Separation Scheme, and its approaches, within the outer portion of Placentia Bay. The affected area extends from the entrance to Long Harbour (at approximately 47º25'N) south to the boundary line between 3Psc and 3Psf, at 46º30'N.

Fishers using this area have expressed concern about large vessel interference and the safety and security of their everyday working environment. These safety and security matters are closely linked to "interference" issues such as reduced vessel operating efficiency (e.g., interruptions when setting or hauling gear, vessel delays) caused by physical presence of transiting vessels.

Placentia Bay fishers harvest crab within this southern portion of the traffic lane route. Very little cod or other commercial species are harvested in this TSS zone, given its water depths. (Crab are usually found in water deeper than 200 m, but sometimes in shallower water as well.)

Placentia Bay (CFA 10 A) has two separate crab quota zones for licence holders in <35' vessels. One group fishes inside a 12-nautical-mile limit and the other harvests crab outside the limit. Only the latter quota area is relevant to this assessment.

DFO managers and fishing industry participants estimate that 150 vessels are operating on established fishing grounds in this area. This figure includes about 121 enterprises in the CFA 10 A <35' fleet harvesting "outside" crab quota and another 25-30 vessels taking their "inside" crab quota in the "outside" quota area. As discussed, crab are fished throughout the southern portion of this area within the deeper 200-m water in the middle part of the TSS. Figure 7.15 shows a particularly heavy concentration of crab gear and harvesting activities in a relatively narrow band of ground just above the 46º30'N boundary line, up as far as about 46º40'N. These activities are within the deeper water but also extend to the east into water depths between 100 m and 200 m.

Fishers note that tankers and other traffic tend to travel directly through this heavily used crab ground as they make their approach into the TSS, which begins a short distance to the north of 46º40'N. They also note that this is the area in which tankers are sometimes required to circle as they await the go-ahead to enter the TSS from the CCG VTS facility at Argentia. At times, several tankers may be circling in a holding pattern, awaiting clearance to proceed to the APA Pilot Station at Red Island.

### 7.9.1 Construction Phase Cumulative Effects

In addition to the Vale Inco NL Project, two other new projects are proposed for Placentia Bay: the NLRC refinery at Southern Head and the NL LNG transshipment terminal facility at Grassy Point. Vale Inco NL construction-related traffic is estimated at three vessels per month. Similar figures are not yet available for the other two planned projects, but it is assumed that these would be in line with those anticipated for the Project, i.e., a total number of up to nine vessels (three for each project) per month, associated with new construction projects for Placentia Bay as a whole. The three proposed projects would be constructed during the same general timeframe, i.e., between 2008 and 2011.

North Atlantic Refinery (NAR) has 325 vessels a year and Newfoundland Transshipment Ltd. (NTL) has 350, for a total of 675 annually. Marine Atlantic seasonal ferry operations into the Port of Argentia generate about 40 incoming vessel movements annually (in the season). Another 70 or so general cargo or container vessels visit ports within the bay. Approximately 785 larger vessels operate within the area, and most of these transit all or parts of the TSS. Considering just these vessels, there are approximately 1,570 large vessel movements annually, or approximately 130 per month, transiting the TSS. The three new projects combined would add another 18 vessel movements per month, for a total of roughly 148 movements each month. The three vessels associated with Vale Inco NL Construction Phase will represent about 4 per cent of the monthly traffic transiting the Placentia Bay VTSS from 2008 to 2010-

11. This traffic will not be a major contributor to the overall level of shipping-related cumulative effects on commercial fisheries activities within the TSS.

Nevertheless, Vale Inco NL is very much aware of the concerns and issues Placentia Bay fisheries participants have raised. The Company is also aware that any initiative it could or might take prior to the start of its Construction Phase to address or mitigate the vessel traffic concerns of fishers would have to be in co-operation with other marine user groups as well as with relevant agencies, if such initiatives are to be effective and successful.

Vale Inco NL is also aware that any such efforts must be focused on finding ways to make the existing vessel traffic management system work more effectively. As such, in the period leading up to the start of construction at Long Harbour, the Company is committed to working closely with crab fishers, FFAW representatives, Transport Canada, CCG, existing or proposed industries and, in particular, with the Placentia Bay Traffic Committee, to seek advice on appropriate measures and options for improving the operating environment of the Placentia Bay traffic management system.

Vale Inco NL believes that in the next few years all marine user groups and agencies can identify and agree on ways to resolve the issues and concerns raised by the fishing industry so as to minimize potential cumulative effects.

### 7.9.2 Operations Phase Cumulative Effects

When all three new projects being planned for Placentia Bay are operational in 5 to 6 years time, traffic movements in the TSS could be double or even higher compared to current levels. By 2012 vessel movements in the Placentia Bay TSS could be in the order of 2,632 to 3,324 rather than the existing (2007) level of 1,570 per year.

The potential result could be much higher levels of fisheries interference than are currently experienced. As noted, the Vale Inco NL contribution to predicted traffic volumes, and to any associated cumulative effects, will be much smaller than those pertaining to the two proposed petroleum facilities.

The most appropriate and effective way to address these potential cumulative effects is through the management of all vessel traffic within Placentia Bay. Any such initiative has to be undertaken through a joint and co-operative effort by all marine user groups. The overall aim would be to improve and enhance the operating environment for all participants. One of its chief objectives would be to create a much safer, more secure and more efficient working environment in which Placentia Bay fishing enterprises could pursue their harvesting activities.

The policy objectives, principles, key components and other key elements of such a management system would need to be developed jointly and co-operatively with all marine user groups and stakeholder agencies. The Placentia Bay Traffic Committee is an appropriate vehicle for leading and facilitating this initiative. For the past 30 years or so, the committee has been involved in overseeing, communicating

and, where possible, resolving traffic management issues and conflicts among its members and stakeholders. Vale Inco NL will support this agency in ongoing identification and resolution of marine traffic issues, fisheries industry concerns, user-group conflicts and day-to-day operational issues.

Vale Inco NL supports industry-wide initiatives and will ensure that all of the vessels involved in shipping raw materials and supplies to its Long Harbour processing operations, or in the transportation of final product, will be appropriately equipped with agreed safety and communications systems.

Vale Inco NL will work with Placentia Bay fishers, FFAW representatives, and other industry user groups, regulatory agencies including CCG, DFO, and Transport Canada, to encourage mitigative measures, research initiatives, or technology investment projects designed to enhance, improve and gain a better understanding of the needs and requirements of the area's marine operating environment, particularly to enhance the safety and security of all participants and vessel operators within the Placentia Bay fisheries industry.

## 7.10 Knowledge Gaps

Knowledge gaps related to Commercial Fisheries and Aquaculture, in the vicinity of the proposed Project Area and in general, are directly related to the identified knowledge gaps for marine fish and fish habitat in Volume 2. The identified gaps do not, however, affect the ability to complete effects prediction exercises for this VEC.

## 7.11 Summary of Effects on Commercial Fisheries and Aquaculture

The primary issues related to the potential effects of Construction, Operations, and Decommissioning Phases on commercial fisheries and aquaculture are:

- Access and use of the fishing grounds;
- Gear damage, both commercial and aquaculture;
- Catch rates;
- Security of supply of raw product; and
- Marketability of product.

After implementation of mitigation, the residual effects of routine activities on the commercial fisheries and aquaculture VEC as summarized in Table 7.12 will be *not significant*.

**Table 7.12 Residual Effects and Significance: Commercial Fisheries and Aquaculture VEC – Summary for all Project Phases.**

| Attribute | Aquaculture | Commercial Fisheries | Processing |
|---|---|---|---|
| **Magnitude** | *negligible* | *Negligible-Low* | *negligible* |
| **Geographic Extent** | *local* | *local* | *local* |
| **Duration** | *long-term* | *long-term* | *long-term* |
| **Level of Confidence** | *High* | *High* | *High* |
| **Certainty of Occurrence** | *medium* | *medium* | *medium* |
| **Significance** | *not significant* | *not significant* | *not significant* |

# 8.0 Summary of Socio-Economic Effects

The assessment of the socio-economic effects of the Long Harbour Nickel Processing Plant indicates that most residual effects on the economy, employment and business will be *significant* and *positive*, while those on local services and infrastructure, recreational activities and commercial fisheries and aquaculture, assuming the implementation of effective optimization strategies, will be *not significant.*

Experience with other large-scale construction projects in the Study Area has shown that, with well-designed management strategies to create or enhance potential positive effects and to avoid or mitigate negative ones, the net benefits of the Project can be positive for local and regional stakeholders.

The economy of the Study Area has in the past suffered with the loss of the military base at Argentia, the Closure of the phosphorus reduction plant in Long Harbour and the decline of employment in the fishery, resulting in substantial population losses over the past decade. Construction of the processing plant will generate substantial economic benefits in the short-term, while the Operations Phase of the Project will provide a substantial and steady source of well-paid employment.

While the temporary influx of a large construction workforce and the subsequent long-term employment of a substantial operations staff could adversely affect the local quality of life if new demands for services and infrastructure exceeded capacity, there appear to be only a small number of cases where this has the potential to occur. These can be addressed by a number of within-Project design elements, or through established corporate policy mechanisms. Other issues can be addressed through co-operative arrangements between Vale Inco NL, the Province, local municipal authorities, and community organizations.