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# LIST OF ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
3PSc	A Division of NAFO
3PS	A Division of NAFO
ACOA	Atlantic Canada Opportunities Agency
AQSG	Air Quality Study Group
AIS	Automatic Identification System
ALERT	Atlantic Emergency Response Team
ALQ	Additional Living Quarters
APA	Atlantic Pilotage Authority
ATV	All Terrain Vehicles
B & B	Bed & Breakfast
BBL	Barrels
BMI	Body Mass Index
CASARA	Civil Air Search and Rescue Association
CBDCs	Canadian Business Development Corporations
CCG	Canadian Coast Guard
CCMC	Canadian Centre for Marine Communications
CD	Canadian Dollar
CEA	Cumulative Effects Assessment
CEAA	Canadian Environmental Assessment Agency
CFA	Crab Fishing Area
CHS	Canadian Hydrographic Services
СМНС	Canadian Mortgage and Housing Corporation
CN	Canadian National
CNA	College of the North Atlantic
CNLOPB	The Canada-Newfoundland Offshore Petroleum Board

Acronym/Abbreviation	Definition
COPD	Chronic Obstructive Pulmonary Disease
CPI	Consumer Price Index
CSA	Canada Shipping Act
CSR	Component Study Report
CSZ	Construction Safety Zone
CYFS	Child, Youth and Family Services
DCS	Document Control System
DFA	Department of Fisheries and Aquaculture
DFO	Federal Department of Fisheries and Oceans
DWT	Dead Weight Tonnage
EA	Environmental Assessment
ECG	Electrocardiogram
ECRC	East Coast Response Corporation
ECS	Electronic Chart Systems
EEA	Employment Equity Act
EHCS	Health and Community Services Eastern Board
EI	Employment Insurance
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
ENC	Electronic Navigation Charts
ERCO	The Electric Reduction Company of Canada
f	Forecast
FAA	Financial Administration Act
FEED	Front-End Engineering and Design
FFAW	Fish, Food and Allied Workers Union
FGVDCP	Fishing Gear & Vessel Damage Compensation Program

Acronym/Abbreviation	Definition	
FICP	Fisheries Interference Compensation Program	
FLC	Fisheries Liaison Committee	
FLM	Fisheries Liaison Manager	
FLOACP	Fisheries LOA Compensation Program	
FPI	Fisheries Products International	
FPSO	Floating Production Storage and Offloading Vessel	
G&V	Gear & Vessel	
GBS	Gravity Based Structure for the Hibernia Project	
GDP	Gross Domestic Product	
HADD	Harmful Alteration, Disruption or Destruction	
HRE	Human Resources, Labour and Employment	
HRLE	Department of Human Resources, Labour and Employment	
HRU	Health Research Unit	
HSEMS	Health, Safety and Environmental Management System	
HSEQ	Health, Safety & Environmental Quality	
I/O	Input/Output	
ICU	Intensive Care Unit	
IQ	Individual Quota	
IALSS	International Adult Literacy and Life Skills Survey	
IBA	Impact and Benefits Agreement	
IMO	International Maritime Organization	
INTRD	Industry, Trade & Rural Development	
IOC	Iron Ore Company of Canada	
IOPCF	International Oil Pollution Compensation Fund	
IPA	Immediate Project Area	
ISPS	International Ship and Port Security	

Acronym/Abbreviation	Definition
JIT	"Just In Time"
JSS	Joint Support Ship
K-12	Kindergarten to grade 12
kms	Kilometre
LER	Local Electrical Room
LFA	Lobster Fishing Area
LLT	Lowest Low Tide
LNG	Liquefied Natural Gas
LOA	Loss of Access
m³/ha	Cubic Metres per Hectare
M12	Main Electrical Room Module
MA	Marine Atlantic
МСР	Marine Code of Practice
Medevac	Medical Evacuations
MOU	Memorandum of Understanding
МТ	Marine Terminal
MUN	Memorial University of Newfoundland
mW	Mega Watts
NAICS	North American Industry Classification System
NAFO	North Atlantic Fisheries Organization
NAR	North Atlantic Refining Limited
NEIA	Newfoundland and Labrador Environmental Industry Association
NL	Newfoundland and Labrador
NLDTW	Newfoundland and Labrador Department of Transportation and Works
NLEMO	Newfoundland and Labrador Emergency Measures Organization

Acronym/Abbreviation	Definition
NLH	Newfoundland and Labrador Hydro
NLHC	Newfoundland and Labrador Housing Corporation
NL LNG	Newfoundland and Labrador Liquefied Natural Gas Limited
NLRC	Newfoundland and Labrador Refining Corporation
NOC	National Occupational Classification
NOIA	Newfoundland Ocean Industries Association
NTL	Newfoundland Transshipment Limited
NTT	Newfoundland Transshipment Terminal
PAO	Provincial Archaeology Office
РВ	Placentia Bay
PBFSC	Placentia Bay Fishers Sub-Committee
PBIMPC	Placentia Bay Integrated Management Planning Committee
PBS	Pilot Boarding Station
PBTC	Placentia Bay Traffic Committee
Pers Comm	Personal Communication
PFHCB	Professional Fish Harvesters Certification Board
PPSC	PanAtlantic Petroleum Systems Consortium
PSEA	Public Service Employment Act
PSSRA	Public Service Staff Relations Act
PTMS	Point Tupper Marine Services
RACOSR	Regional Advisory Council on Oil Spill Response
RCMP	Royal Canada Mounted Police
RIHA	Regional Intergraded Health Authority
SAR	Search and Rescue
STF	Skills Task Force
SS	Statistical Section

Acronym/Abbreviation	Definition	
TAC	Total Allowable Catch	
ТС	Transport Canada	
ТСН	Trans Canada Highway	
TL	Traffic Lane	
TSS	Traffic Separation Scheme	
ТТО	Trades, Technology and Operations	
UA	Unit Area	
US	United States	
VBNC	Voisey's Bay Nickel Company	
VOC	Volatile Organic Compounds	
VECs	Valued Socio-Economic Components	
VTMP	Vessel Traffic Management Program	
VTMS	Voluntary Traffic Management Scheme	
VTS	Vessel Traffic Services (CCG's Argentia Facility)	
VTSS	Vessel Traffic Separation Scheme	
VTSZ	Vessel Traffic Services Zone	
WISE	Women in Science and Engineering	

# **1.0 INTRODUCTION**

Newfoundland and Labrador Refining Corporation (NLRC) is pleased to present the Southern Head Refinery Socio-Economic Assessment. This volume of the Project's Environmental Assessment provides a description of the socio-economic environment in which NLRC is proposing to construct and operate a new crude oil refinery, an assessment of the potential impacts of the refinery and the measures that will mitigate any potential negative effects and enhance the benefits of the Project.

An important aspect of the environmental assessment is the input from the area communities. Their questions, concerns and suggestions have been carefully considered and addressed throughout the planning and design of the Project.

# **1.1 Environmental Assessment**

The proposed refinery project is being reviewed by provincial and federal environmental assessment processes. The Department of Environment and Conservation oversees the provincial process; Transport Canada and the Department of Fisheries and Oceans, in conjunction with the Canadian Environmental Assessment Agency (CEAA), are the Responsible Authorities for the federal assessment.

The assessment will determine whether a proposed project is likely to have a significant adverse impact on the environment. Environmental effects are the direct changes to the environment, including health and socio-economic conditions, physical and cultural heritage.

The EA documents (an Environmental Impact Statement (EIS) for the provincial government and a Comprehensive Study report (CSQ) for the federal government) identify the environmental impacts of the Project, identify mitigation measures, predict the significance of residual effects, and suggest appropriate monitoring and follow-on programs.

Environmental impacts will be defined and discussed for all phases of the project (construction, operation, and decommissioning) and in the following terms – nature, spatial extent, frequency, duration, magnitude (qualitative and quantitative), significance and level of certainty.

## **1.2 Socio-Economic Effects Assessment**

The socio-economic effects assessment takes into account the fact that the area is generally familiar with the boom and bust aspects of major construction projects as well as with the petroleum industry, specifically through the long-term operations of the refinery at Come By Chance and the crude oil transshipment facility at Whiffen Head. The geographic area considered in the assessment includes the primary Study Area, the Employment Catchment area, the Avalon Region of the island and the province as a whole (Figure 1.1).



Figure 1.1 Socio-Economic Study Area

#### Social Impact Assessment

Social impact assessment considers measurable change in human populations, communities and social relationships resulting from a development project. It assesses the social and cultural impacts of the Project and, in particular, how it might alter the lives of residents – how they work and play, relate to each other, organize to meet their needs and generally cope as members of society. The assessment provides a realistic appraisal of possible social ramifications and suggests possible mitigation and enhancement measures.

Much of the qualitative information for the assessment was gathered from interviews with major stakeholders, government and service providers in order to capture an accurate picture of the various social components, their relationship to each other and some of the more subtle dynamics. Because social and cultural systems are, in many cases, fluid and very personal (e.g. health, social well-being), they can be more challenging to assess than other systems.

#### Economic Impact Assessment

This study considers the economic the Project's impact on the economy of the Study Area, as well as that of the province, with other large scale construction projects (the Hibernia and Terra Nova projects at Bull Arm) and the economic effects of the petroleum industry in the province. In addition, the multiplier approach has been used as another means to estimate the overall economic impact of the Project.

#### 1.2.1 Scope of the Assessment

The socio-economic impact assessment covers potential economic, social and cultural impacts, direct and indirect, as well as corresponding cumulative impacts of proceeding with the refinery.

The Guidelines for the Environmental Impact Statement of the Newfoundland and Labrador Refinery Project issued by the Government of Newfoundland and Labrador (June 2007) specifically mentions that the existing environment should describe:

- Environmental health (factors in the environment that have exposure potential for humans);
- The existing public health and acute care systems within the province and the Study Area;
- Baseline health;
- Existing municipal infrastructure and services and capacity; and
- Employment and training.

The Guidelines also specifically state that the effects assessment should address:

- Public health services in relation to potential demand as a result of the refinery;
- Adequacy of existing acute care services;
- Potential need for an increase in community health support services;

- Impact on low income individuals and families especially relating to displacement due to potential increases in housing costs; and
- Impact on existing municipal infrastructure and capacity and services in terms of commercial/residential spin-off.

Guidance on the methodology and scope of the socio-economic impact assessment (SEIA) of the Project was provided through contacts with key regulatory bodies and careful study of:

- The *Guide to the Environmental Assessment Process* issued October, 2006, by the Environmental Assessment Division, Department of Environment and Conservation, Government of Newfoundland and Labrador;
- The draft (March 2007) and final *EIS Guidelines* (June 2007) issued for the Newfoundland and Labrador Refinery Project by the Department of Environment and Conservation, Environmental Assessment Division, Government of Newfoundland and Labrador.
- The Canadian Environmental Assessment Agency Act and Guidelines; and
- Public consultation in potentially affected communities. The methodology used is discussed in detail in Volume 5.

#### 1.2.2 Data Sources and Limitations

Considerable basic socio-economic data on the communities is available through government agencies and databases, such as the Community Accounts, and through regional economic development boards. NLRC's public consultation program in the Study Area, especially the open houses, has also been an important source of information. (See Volume 5, Public Consultations.)

## **1.3** Overview of the Study Area

Most of the communities in the Primary Study Area have small populations (fewer than 1,000 residents) and basic community services. Because of the geography and the need to be close to the ocean for participation in traditional fishing activities, the majority of Study Area communities are located on ocean bays. The exception is Goobies, located inland at the intersection of the Burin Peninsula Highway and the Trans-Canada Highway.

Placentia Bay has considerably more large-scale industries (e.g. Whiffen Head Transhipment Terminal, North Atlantic Oil Refinery, Marystown Shipyard, Cow Head Offshore Fabrication Facility, and the industrial cluster at Argentia) than any other area of the Island of Newfoundland. These sites are located in Placentia Bay because of its deep water, sheltered and ice free bays (needed for large marine vessel traffic) and its proximity to off-shore oil and gas production and exploration activities.

The main service centres for the Study Area are Arnold's Cove, Clarenville, Placentia and Marystown.

- Arnold's Cove is located on the west side of the Isthmus of Avalon, southeast of the proposed project site. Its population in 2006 was 1,024, a decline of 2.1 per cent since 2001. Services include volunteer firefighting services, a K-12 school, an industrial park, a hotel, a medical clinic and a pharmacy. The community wharf is maintained by the Arnold's Cove Harbour Authority. Most residents are employed at the North Atlantic Refinery or the Icewater Seafoods Fish Plant. The Whiffen Head Transshipment Terminal is located nearby, and the town boasts a spectacular Placentia Bay lookout point with views of the North Atlantic Refinery, Whiffen Head and Southern Head, site of the proposed Project.
- Clarenville is located approximately 55 km north of the proposed Project site. It is the only town in the Study Area that has experienced a population increase (3.3%) from 5,104 in 2001 to 5,274 in 2006. Clarenville is the main service centre for the Study Area as well as for the Bonavista Peninsula and provides recreation facilities, retail/service shops, fire fighting, primary, secondary and post-secondary education, hospital and long-term care services and other services. Current construction in the community includes a new long-term care facility with a capital cost of \$46.6 million over five years. The town is also planning an events centre featuring an ice rink and indoor walking track, scheduled to open in fall 2008.
- Located on the east side of Placentia Bay, Placentia is a community of 3,898 residents (Census 2006). The area was originally inhabited in the 1600s by the French and still has many traits of this heritage. The amalgamated town of Placentia consists of the former municipalities of Placentia, Jerseyside, Freshwater, Dunville and the incorporated area of Argentia. Placentia has many archaeological sites, two museums and a ferry terminal serving Marine Atlantic's summer route.
- On the west side of Placentia Bay on the Burin Peninsula, Marystown has a population of 5,436. The community is best known for its shipbuilding facility, operated by Kiewit Offshore Services since 2002, and its offshore fabrication facility at Cow Head. Marystown is the service centre for the Burin Peninsula and also caters to hunting, fishing, camping and ATV enthusiasts. Nearby is Burin, known for its fish plant and College of the North Atlantic (CNA) campus. Traditionally, the residents of the Burin Peninsula, if not working at the fish plant or the shipyard, have been involved in some aspect of the fishery.

# 1.4 Legislation, Permits and Policies

In addition to the federal and provincial environmental assessment processes, the project must be designed, constructed and operated within a framework of federal, provincial and municipal regulation, as well as the many design and construction codes and standards. A project-wide listing of legislation, permits and approvals anticipated by the Project is provided in Volume 2, Project Description and Planning.

#### 1.4.1 Legislation

The following list of federal and provincial legislation is applicable to the socio-economic requirements of the Project.

Government of Canada

- Financial Administration Act (FAA)
- Employment Equity Act (EEA) and Regulations
- Public Service Employment Act (PSEA) and Regulations
- Public Service Staff Relations Act (PSSRA)

Government of Newfoundland and Labrador

• The Income and Employment Support Act and Regulations

#### 1.4.2 Policy Input from Consultations

NLRC will also develop policies, plans and initiatives to address requests and suggestions heard during consultation. The following is a list of policies, plans and initiatives that have been discussed and will be considered:

- Housing and Accommodations Policies for Construction Phase
- Harassment- and Discrimination-Free Workplace Policy (Creating a Respectful Work Environment)
- Gender and Employment Equity Plans
- Strategy to minimize wage gaps for women
- Family Friendly Workplace Policies
- Initiatives for the hiring of journeypersons, apprentices, engineering and technology students during construction
- Initiatives to increase opportunities for under-represented groups
- Training initiatives and skills upgrading

• Potential initiatives for employee well-being (i.e. recreational facilities, Employee Assistance Program and accommodation for childcare and homecare responsibilities)

## 1.5 Future Environment

The Guidelines require that NLRC consider the future environment without the Project.

One of the building blocks of this assessment has been the successful blend of vibrant natural beauty and resources; small, self-sufficient rural communities; and major industrial operations in this part of Placentia Bay and the Isthmus. NLRC has made this the symbol of the Project.

Building the Refinery will contribute to the changing nature of inner Placentia Bay. However, even without the Refinery, the attributes of Placentia Bay that make it an excellent location – deep water, ice-free, strategically located for global industries, an existing industrial infrastructure, established governance, skilled workforce – will continue to attract large-scale industry to Placentia Bay.

The area has some key mechanisms in place to manage the future: the Placentia Bay Integrated Management Committee, the Placentia Bay Traffic Committee, the FFAW Placentia Bay Sub-Committee, the economic development associations and a strong network of volunteers and volunteer organizations.

# 2.0 EFFECTS ASSESSMENT METHODOLOGY

The environmental assessment is meant to determine whether a proposed project is likely to cause significant adverse impact on the environment, including the socio-economic or human environment. The Socio-economic portion of the assessment covers potential economic, social and cultural Project-related effects, direct and indirect, as well as potential cumulative effects.

The Refinery Project is being reviewed under provincial and federal assessment processes. The methodology used conforms to the methods and expectations of both processes.

Two general types of effects are considered in this document:

- 1. Effects of the environment on the Project; and
- 2. Effects of the Project on the environment, including the biophysical and human environments.

Alternative means of carrying out the project must be considered as well as the cumulative effects of the proposed project in combination with other past, present and identifiable future projects or activities. The likelihood and effects of accidents and malfunctions must also be considered.

Effects assessment methodology used here conforms to the Canadian Environmental Assessment Act (CEAA); its associated Responsible Authority's Guide; CEA Agency Operational Policy Statements (OPS-EPO/5-2000) and OPS-EPO/3-1999 (cumulative effects); and it follows the requirements of the EIS/Comprehensive Study Report Guidelines, issued by the Department of Environment and Conservation on June 19<sup>th</sup> 2007.

# 2.1 Scoping

Scoping of an assessment includes determining the spatial and temporal extent of the assessment, selecting which components of the ecosystem to assess and which project activities to analyze. Scoping was conducted according to the following steps, not necessarily in chronological order:

- Review of relevant information on Project activities and literature on the effects of refinery operations, tankers and marine terminals, and oil and gas activities, including associated major construction and fabrication projects in the province;
- Consultations with key groups and the public throughout the assessment;
- Discussions among the Project assessment team; and
- EIS Guidelines prepared by the Newfoundland and Labrador Department of Environment and Conservation with input from relevant government agencies such as Transport Canada (the Principle Responsible Authority, the 'RA', under federal CEAA legislation), Fisheries and Oceans Canada (also an RA), Environment Canada

(a federal Authority or FA), Health Canada (also an FA), the CEA Agency, other government departments, and the interested public.

## 2.2 Consultations

In preparation for the proposed development and the required EIS, the Proponents and their consultants met with relevant government agencies, representatives of the fishing industry and other interest groups as well as the general public in communities that may be affected by the Project. The purpose of these consultations was to describe the Project, to identify issues and concerns, and to gather additional information relevant to the EA.

In addition to frequent meetings with community representatives and groups such Chambers of Commerce, Development Associations and volunteer groups, consultations were undertaken with the following agencies and interest groups:

#### Federal

- Health Canada
- Environment Canada
- Fisheries and Oceans
- Transport Canada
- Statistics Canada
- Canadian Coast Guard

## Provincial

- Environment and Conservation
- Human Resources, Labour and Employment
- Women's Policy Office
- Rural Secretariat
- Business
- Municipal Affairs
- Transportations and Works
- Health and Community Services
- Finance
- NL Housing Corporation
- Eastern Health

#### Institutions, Associations, Interest Groups

- Women in Resource Development Committee
- Provincial Advisory Council on Status of Women

- Health Research Unit, Faculty of Medicine, Memorial University
- Professional Engineers and Geoscientists of NL
- NL Environmental Indsutry Association
- College of North Atlantic
- SmartBay, Canada Centre for Marine Communications

Appendix A provides a list of agencies and groups consulted and the key issues discussed with government agencies.

Consultations with the communities are detailed in Volume 5 Public Consultation of the EIS. As one means of identifying issues of interest to the public, 415 exit surveys were completed at the open houses. Participants identified their top three topics of interest. The information from the exit surveys was generally indicative of the questions raised during the Question and Answer part of the open house and the issues of concern (Table 2.1).

#### Table 2.1 Issues Raised by the Public in Exit Surveys at the Open Houses

Issues	Percentage from the Open House Exit Surveys
Local Employment	81%
Maximize Local Benefits	50%
Workforce Availability	35%
Oil Spill Response	32%
Air Emissions	29%
Local Investment	28%
Oil Spill Risk	25%
Increased Vessel Traffic	16%
Open Consultations	11%

# 2.3 Valued Ecosystem Components (VECs)

In applying environmental assessment over the years, agencies and the public have found it useful to focus the assessment through identifying Valued Ecosystem Components, referred to as VECs. VECs are environmental components that will be affected by the project and are of legal, scientific, ecological, cultural or economic value.

Identification of socio-economic VECs for the Refinery Project was accomplished through a series of actions; issues scoping through regulatory and public consultation; several iterative workshops among Project engineering and environmental consultants; as well as through Guidelines issued by the provincial/federal Assessment Committee, chaired by the Department of Environment and Conservation; and consideration of the many recent environmental assessments for projects in the province.

The Guidelines for the Environmental Impact Statement for the Newfoundland and Labrador Refinery Project issued by the Province specifically mentions the following socio-economic factors:

- Environmental health (factors in the environment that have exposure potential for humans);
- The existing public health and acute care systems within the province and the Study Area;
- Baseline health;
- Existing municipal infrastructure and services and capacity; and
- Employment and training.

And, the impact assessment should address:

- Public health services in relation to potential demand as a result of the refinery;
- Adequacy of existing acute care services;
- Potential need for an increase in community health support services;
- Impact on low income individuals and families, especially relating to displacement due to potential increases in housing costs; and
- Impact on existing municipal infrastructure capacity and services in terms of commercial/residential spin-off.

The VECs are also based upon expressed public comments related to social, cultural, economic, or aesthetic values and scientific community concerns. From a local perspective, most interest in the Refinery Project is related to the possibilities for employment and business development, and most concern is for potential effects on the fishery and the seabirds.

The VECs addressed in the Refinery Socio-economic Assessment are:

- Economics
- Employment and Business
- Commercial Fisheries and Aquaculture
- Health and Community Services
- Education and Training
- Land Use and Municipal Planning
- Infrastructure and Services
- Emergency Infrastructure
- Historic Resources.

These VECs are discussed at varying levels of detail depending on the potential for significant effects. Air Quality is treated as a VEC in the biophysical assessment in Volume 3 and is also referenced in the discussion on Community Health and Well-being.

#### 2.3.1 Economics

The Refinery will be built and operated within an economic context that includes international, national, provincial and regional aspects. The focus of the assessment is on the provincial and regional levels, where the effects extend from pre-planning through construction, operations and decommissioning.

#### 2.3.2 Employment and Business

Employment and business opportunities associated with the project have been identified though the public consultation process as the two top priorities in the local communities. Capacity and potential effects are discussed at the regional and provincial levels.

#### 2.3.3 Commercial Fisheries and Aquaculture

The commercial fishery is universally acknowledged as an important element in the society, culture, economic and aesthetic environment of Newfoundland and Labrador. Historically, Placentia Bay has supported a rich and diverse fishery and, relatively speaking, still does. In addition, there are a number of commercial aquaculture ventures (mostly blue mussel) in Placentia Bay. This VEC is of prime concern from public and scientific perspectives, at local, national and international scales.

#### 2.3.4 Health and Community Services

An important aspect of understanding the environment in which the Refinery would be built and operated is health and well-being at the individual and community levels. Communities in the larger Study Area have experienced some of the negative effects of industrial development, from poor air quality to 'boom and bust' effects of major stand-alone construction projects. Much has been learned by residents, communities and agencies from these situations and their effect on health and well-being. Measurement and assessment is based on a number of health determinants at the institutional and individual levels.

#### 2.3.5 Education and Training

Education and training are key factors in consideration of the project workforce supply and demand aspects. They also affect community health and well-being. Capacity and opportunity in the context of education and training are considered on regional and provincial scales.

#### 2.3.6 Land Use and Municipal Planning

Land use includes consideration of the current and traditional use of the area surrounding the proposed Project site and includes the Southern Head peninsula and nearby communities and coastal areas.

Tourism is a growing industry in the Province. Placentia Bay supports some of the largest seabird colonies in the world plus large numbers of migratory birds of various species and origin. Seabirds are an important resource for bird watching (one of the fastest growing outdoor activities in North America) and general tourism. As well, with the considerable interest in sightseeing visits to the Bull Arm construction site during the 1990s, it is possible that the Refinery Project itself may become a tourist attraction.

Placentia Bay has 365 islands, many of which had communities that were resettled. Cabins and residences on these islands are increasing in number to support seasonal fisheries, as second homes and for recreation, and have resulted in a new type of marine traffic.

Several of the communities within the primary Project Area are incorporated and have Municipal Plans.

## 2.3.7 Infrastructure and Services

Infrastructure and services are provided by all levels of government as well as by community groups, regional associations and volunteers. The discussion on infrastructure and services centres primarily on regional capacity.

#### 2.3.8 Emergency Infrastructure

Emergency infrastructure has been treated as a separate VEC, not because of concerns about policing, but from the point of view of adding a large industrial complex and significant workforce and population to the area. The latter require infrastructure and trained emergency service response personnel.

#### 2.3.9 Historic Resources

The Project Area residents and the provincial government have an interest in preserving the history and culture of the province and of the Placentia Bay region. Sites of historic significance identified during surveys are identified and catalogued with the Provincial Archaeology Office as part of the historical record of human activity. Some sites of historic and/or cultural significance have become public attractions.

# 2.4 Data Gaps

The Guidelines require that data gaps from a lack of previous research or practice be described. Information on socio-economic conditions was gathered from a broad selection of recent and reliable sources, published and unpublished.

Several socio-economic studies have been completed in the region as a result of the high level of construction activity during the past 15 years in Placentia and Trinity Bays. However, given the fast pace of political, economic and social change, and the fact that most of these studies

are now more than five years old, information needed updating to reflect the current socioeconomic environment.

In early 2007, the study team conducted a series of personal interviews with knowledgeable individuals, primarily service providers and municipal leaders based in the Study Area, to gain a better understanding of the available quantitative data. This information was augmented by attendance at numerous open houses held in the Study Area to discuss the Project. Information was sought on the limitations of specific datasets, on the interpretation of key trends and of the positive or negative effects of a new refinery. Where possible, conclusions were built on quantitative and qualitative information corroborated by multiple sources, including key informants. (See Appendix A for list of Key Informants)

Key sources used are:

- Results of Statistics Canada 1996, 2001 and 2006 Census;
- Government of Newfoundland and Labrador Community Accounts;
- Long Harbour Commercial Nickel Processing Plant 2007 Socio-economic Component Study, Feb, 2007;
- A Review of the Health Status of the Come By Chance Area, Newfoundland and Labrador, June 2007, Health Research Unit, Memorial University;
- Interviews with key stakeholder organizations and service providers including municipalities, health and school boards, RCMP, regional economic developmental boards, Canada Mortgage and Housing Corporation, Provincial Government Departments (Transportation and Works, Municipal Affairs, Human Resources, Labour and Employment, Environment and Conservation).

## 2.4.1 Component Studies

The Guidelines specified that the Proponent prepare a number of Component Studies, including one on Socio-economics. The focus was on public and acute care health systems and services, baseline health status, municipal infrastructure services and capacities, and employment and training.

The Socio-economic Component Study has been prepared through AMEC Earth & Environmental with a specific appendix by the Health Research Unit (HRU), Faculty of Medicine, Memorial University, entitled 'A Review of the Health Status of the Come By Chance Area, Newfoundland and Labrador'. The Socio-economic Component Study has been submitted to government as part of the EIS.

The Guidelines also ask for a Component Study on Historic Resources. The Historic Resources Assessment for the Project was completed by Anvil Consulting, led by Roy Skanes, under permit from the Provincial Archaeology Office. The Historic Resources Component Study has been submitted as part of the Refinery EIS.

#### 2.4.2 Background Studies

In addition to the required Component Study, the Proponent has undertaken specific research into key aspects of the socio-economic environment and potential effects of the Project.

To address concerns about the possible effects of emissions, air dispersion modelling was done; the results are provided in another Component Study on Air Quality. To fully assess the effects of the emissions, the Proponent has had two background reports prepared: the baseline report by HRU and a human health and ecological effects assessment prepared by SENES Consultants Limited.

Within the Socio-economic Assessment, the Proponent has considered the commercial fisheries and aquaculture VEC. An important input to the assessment has been a survey carried out by the Fish, Food and Allied Workers union (FFAW). The results from this survey are provided as an appendix in this document, Volume 4 of the EIS, Socio-economic Assessment.

## 2.5 Boundaries

Boundaries have been defined using CEA Agency (2003) as guidance. The scope of the assessment includes temporal and geographic or spatial considerations. The temporal considerations include the entire project schedule from construction through operations and decommissioning. The geographic area to be considered in the assessment includes not just the Refinery site but the area within which environmental components could be affected.

#### 2.5.1 Temporal

The temporal boundaries of the Project run from the start of construction through decommissioning. The temporal boundaries of the different Project phases include:

- Construction from 2008 to 2011: Site preparation may start in late 2007, e.g., site clearing, access road, surveys, etc. Construction activities will occur year-round for an estimated a three-and-a-half-year time period and, at times, may extend for 24 hours of the day.
- Operation and Maintenance from 2011 to 2036: Refinery operations will be 24 hours a day, 365 days a year. The design life of the refinery is 25 years. However, it is anticipated that the refinery will operate indefinitely through maintenance, re-fit, upgrades and expansion as long as it is economically feasible.
- Decommissioning would take an estimated two years to complete.

#### 2.5.2 Spatial

For the Refinery Project, NLRC considers all of Placentia Bay to be the Study Area and the area immediately adjacent to the Southern Head site as the Project Area. However, the socioeconomic assessment also considers an Employment Catchment Area, regional and provincial considerations. The socio-economic assessment is based on the following spatial boundaries:

- Primary Study Area: Come By Chance, Sunnyside, Goobies, Clarenville, Arnold's Cove, Southern Harbour, Little Harbour, North Harbour, Garden Cove, Swift Current, Placentia/Argentia and Marystown. These communities are the focus of the local area investigations because they are closest to the proposed project site and/or have the potential to provide a greater number of services to the Project when compared with other communities in the region.
- Employment Catchment Area: includes the Primary Study Area, all other communities within a 50 km commuting distance from the Project site, the Placentia and Marystown areas and those communities located between Bay Roberts and Holyrood on the west side of Conception Bay. A relatively large number of skilled workers, some of whom are working elsewhere, live within these catchment areas. It is anticipated that workers from this area will be attracted to work at the Refinery. In addition, workers from the central metropolitan area of St. John's are likely to be employed at the Project site, as well as individuals throughout the province.
- The Avalon and Burin Peninsulas and the Clarenville-Bonavista region, for regional economic analysis.
- The province of Newfoundland and Labrador for regional economic analysis.

Refer to Figure 1.1 in Section 1 of this report.

## 2.6 Effects Assessment Procedures

The systematic assessment of the potential effects of the Project phase involved three major steps:

- Preparation of interaction (between Project activities and the environment) matrices;
- Identification and evaluation of potential effects including description of mitigation measures and residual effects; and
- Preparation of residual effects summary tables.

Cumulative effects are also considered. The approach is outlined in Section 15.0 Cumulative Effects Assessment.

The assessment is based on a thorough and up-to-date description and understanding of the existing socio-economic environment.

#### 2.6.1 Identification and Evaluation of Effects

Interaction matrices identify all possible Project activities that could interact with any of the VECs. The matrices include phases and activities in which interactions with the socio-economic environment could occur. The interaction matrices are used only to identify potential interactions; they make no assumptions about the potential effects of the interactions. The interaction matrices were developed and discussed by the Proponent, the Project team and the

environmental consultants at a workshop in January 2007. The interaction matrix is shown in Figure 2.1.

Interactions were then evaluated for their potential to cause effects, and the various factors identified in the interaction matrix were grouped into the various VECs for further assessment. In instances where the potential for an effect of an interaction was deemed impossible or extremely remote, these interactions were not considered further. In this way, the assessment focused on key issues and more substantive effects.

The interaction matrix and subsequent discussions were based on:

- Outcomes of the issues scoping sessions held;
- A review of comments received during public, stakeholder and regulatory consultation;
- Consideration of the Socio-economic Baseline, in conjunction with the 2006 Project Description and additional personal interviews with knowledgeable individuals;
- Regulatory requirements, including the Guidelines for the Environmental Impact Statement;
- Professional judgements, particularly on the basis of the numerous studies undertaken for industrial projects proposed for Placentia Bay, Including: Long Harbour Commercial Nickel Processing Plant, 2007 Socio-Economic Component Study (Jacques Whitford Limited, 2007); Socio-Economic Overview of Placentia Bay, Newfoundland (Community Resource Services Limited and Jacques Whitford Limited, 2001); Placentia Bay Project Benefits Study (Canning and Pitt Associates, Inc., 2004); All the Skills to Succeed: Report of the Newfoundland and Labrador Skills Task Force (March 2007); and
- Various conferences and workshops including "Half a Day in Placentia Bay", Newfoundland and Labrador Environmental Industry Association (May 17<sup>th</sup> 2007), and "Economic Development Benefits of the Oil and Gas Industry in Newfoundland and Labrador", Memorial University (Oil and Gas Development Partnership and the Harris Centre).

When data were insufficient to allow certain or precise effects evaluations, predictions were made based on professional judgement. In such cases, this uncertainty is documented. For the most part, the potential effects of major construction projects and operation of crude oil refineries are reasonably well known.
Project Activities Valued Ecosystem Components											
	Employment / Job Creation	Training	Business Opp. & Impacts	Comm. Econo. Dev. (CED)	Fisheries	Aquaculture	Tourism & Recreation	Infrastructure & services	Quality of Life	Historic Resources	
	Site Development/ Project Footprint	Y	Y	Y	Y	Y	0	Y	Y	Y	0
Construction	New Access Road, Bridge, Trans. Lines	Y	Y	Y	Y	0	0	Y	Y	Y	0
	Marine Terminal	Y	Y	Y	Y	Y	0	Y	Y	Y	0
	Crude Oil Process Plant	Y	Y	Y	Y	0	0	0	Y	Y	0
	Site Utilities & Infrastructure	Y	Y	Y	Y	Y	0	0	Y	Y	0
	Shipping	Y	Y	Y	Y	Y	Y	Y	Y	Y	0
	Access Road, Bridge, Trans. Lines - Maintenance	Y	Y	Y	Y	0	0	Y	Y	Y	0
	Marine Terminal	Y	Y	Y	Y	Y	0	Y	Y	Y	0
Operations	Crude Oil Process Plant	Y	Y	Y	Y	0	0	0	Y	Y	0
	Site Utilities & Infrastructure	Y	Y	Y	Y	Y	0	0	Y	Y	0
	Shipping	Y	Y	Y	Y	Y	0	Y	Y	Y	0
Decommissioning		Y	Y	Y	Y	0	0	0	Y	Y	0
Accidental Events		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Figure 2.1 Socio-Economic Matrix

# 2.6.2 Classifying Anticipated Environmental Effects

The concept of classifying environmental effects simply means determining whether they are negative or positive. The following includes some of the key factors that are considered for determining negative (socio-economic) environmental effects, as per the CEAA guidelines (CEAA 1994):

- transformation of natural landscapes;
- discharge of persistent and/or toxic chemicals;
- toxicity effects on human health;
- loss of, or detrimental change in, current use of lands and resources for traditional purposes;
- foreclosure of future resource use or production; and
- negative effects on human health or well-being.

Positive effects or benefits are also identified and considered in the assessment.

# 2.6.3 Mitigation

Most effects, including any significant ones, can be mitigated by additions to or changes in equipment, operational procedures, timing of activities, or other measures. Mitigation measures appropriate for each effect predicted in the matrix were identified and the effects of various Project activities were then evaluated based on appropriate mitigation measures being applied. Effects predictions were made taking into consideration both standard and project-specific mitigations and can thus be considered "residual effects."

# 2.6.4 Application of Evaluation Criteria for Assessing Environmental Effects

Several criteria were taken into account when evaluating the nature and extent of environmental effects. These criteria include (CEA Agency 1994):

- magnitude;
- geographic extent;
- duration and frequency;
- reversibility; and
- ecological, socio-cultural and economic context.

Magnitude describes the nature and extent of the environmental effect for each activity. Geographic extent refers to the specific area (km<sup>2</sup>) potentially affected by the Project activity, which may vary depending on the activity and the relevant VEC. Duration and frequency describe how long and how often a project activity and/or environmental effect will occur. Reversibility refers to the ability of a VEC to return to an equal, or improved condition, at the end of the Project. The ecological, socio-cultural and economic context describes the current status

of the area affected by the Project in terms of existing environmental effects. The assessment also considers the level of confidence in the prediction of effect and the degree of certainty (likelihood) that the effect will occur. The assessment concludes with consideration of the effectiveness of stated mitigation or enhancement measures before assigning an overall level of significance.

Table 2.2 provides definitions of the CEAA criteria while Table 2.3 describes the ratings used in assessing each of the attributes. The analysis combines to provide a residual effect and estimate of significance. In the assessment, a table is developed for each VEC, indicating the results of the effects analysis.

Attribute	Definition
Direction	Describes the ultimate long-term trend of the effect.
Magnitude	Describes the severity or intensity of the effect; typical measurements of magnitude indicate gains or losses in features or changes in conditions.
Geographic extent	Describes the area over which the particular effect will occur and is similar to the spatial boundaries of the assessment.
Duration	Refers to how long an effect will occur and is closely related to the project phase or activity that could cause the effect.
Frequency	Is associated with duration and refers to the number of occurrences that can be expected during each phase of the project.
Reversibility	Is the ability of the human community (i.e., economy, society and culture) to return to conditions that existed prior to the adverse project effect. If project effects are positive, this attribute is not applicable.
Level of Confidence	Enables the analyst to assign a level of confidence to the prediction, based on an understanding of the limitations of the prediction exercise.
Certainty	Enables the analyst to assign a level of probability that the effects will occur.
Mitigation or Enhancement Success	Enables the analyst to determine how well mitigation contributes to lessening of adverse effects or how well enhancement measures contribute to positive effects.
Significance	An overall measure of the effect on the receptor.

 Table 2.2
 Definitions of Attributes Used in the Effects Assessment Process

The assessment process itself involved use of:

- Quantitative analysis of indicator variables;
- Informed source opinions obtained by interviews with officials, public service providers and practitioners;
- Advice and input from potentially affected groups and individuals through the public and stakeholder consultation program;
- Relevant literature; and
- Professional judgment based on the training and experience of the analysts.

The attributes noted above were used to describe the residual effects that might occur as a result of Project interactions with the VECs. The term 'residual' indicates attention is given to assessing the effect after implementation of specified mitigation and/or enhancement measures.

Careful assessment of residual effects is critical to the determination of their significance, especially in the absence of threshold values with respect to socio-economic impacts specified in standards, legislation or regulations.

Table 2.3 presents assessment ratings for each of the effects attributes used in the Newfoundland and Labrador Refinery EA. In addition, definitions are provided for the terms used to describe mitigation success and significance. In the following sections, the suggested level of significance is noted in connection with each residual effect.

Effects Ratings	
Direction	
Adverse (A)	Effect is worsening or is not desirable.
Neutral (N)	There is no effect.
Positive (P)	Effect is improving or is desirable.
Magnitude	
Negligible (N)	Does not have a measurable effect on valued socio-economic components.
Low (L)	Has a measurable effect on socio-economic components but is of short-term duration.
Medium (M)	Has a measurable effect on socio-economic components but is of medium duration.
High (H)	Has a measurable and sustained effect on socio-economic components.
Geographic Extent	
Local (L)	Effect is limited to the Study Area and/or the Employment Catchment Area
Regional (R)	Effect extends to the Socio-Economic Regional Study Area.
Provincial (P)	Effect extends throughout the province of Newfoundland and Labrador.
Sub- National/National	Effect extends beyond Newfoundland and Labrador.
Duration	
Short-term (S)	Effect is expected to last less than two years.
Medium-term (M)	Effect is expected to last between two and ten years.
Long-term (L)	Effect extends throughout operation phase or beyond.
Frequency	
Rare (R)	Effect occurs infrequently and is difficult to predict.
Intermittent (I)	Effect occurs infrequently but when it will occur can be predicted.
Continuous (C)	Effect occurs continuously.
Reversibility	
Yes	VEC is capable of returning to an equal, or improved, condition once the disturbance has ended.
No	VEC is not capable of returning to an equal, or improved, condition once the disturbance has ended.
Level of Confidence	
Low (L)	Information provided should be considered as having a low probability of being absolutely accurate.
Medium (M)	Information provided should be considered as having a medium probability of being accurate.
High (H)	Information provided should be considered as having a high probability of being accurate.

Table 2.3 Effects Ratings Used for Assessing Socio-Economic Effects

Effects Ratings	
Certainty	
Low (L)	The effect can be considered to have a low probability of occurring.
Medium (M)	The effect can be considered to have a medium probability of occurring.
High (H)	The effect can be considered to have a high probability of occurring.
Mitigation or Enhancement Success	
Highly effective	Mitigation measures allow any negative effects to the socio-economic indicator to be eliminated and the indicator returns to its original condition. Enhancement measures result in a measurable positive change in the socio-economic indicator.
Moderately effective	Mitigation measures allow any negative effects to the socio-economic indicator to be partially eliminated and there is no permanent negative impact. Enhancement measures will result in a slight positive change in the socio-economic indicator.
Minimally effective	Mitigation measures do not eliminate negative effects to the socio-economic indicator and there is major change in socio-economic indicator with a permanent negative impact. Enhancement measures do not result in any positive changes in the socio- economic indicator.
Significance	
Negligible	No effects.
Minor	Low-level effects are distinguishable. These are usually limited to the short-term and are geographically circumscribed but are not considered disruptive to normal socio- economic conditions even if widespread and sustained. <sup>1</sup>
Moderate	Effects are clearly distinguishable and result in elevated awareness or concern among stakeholders or materially affect the well-being of defined populations/communities. Usually are short- to medium- term in duration and are amenable to management if they occur over the longer term.
High or Major	Effects are highly distinguishable and result in strong concern or support among stakeholders or result in substantive changes in the well-being of defined populations/communities.

#### 2.6.5 Significance Rating

Significant environmental effects are those considered to be of sufficient magnitude, duration, frequency, geographic extent, and/or reversibility as to cause a change in the VEC that will alter its status or integrity beyond an acceptable level. Establishment of the criteria is based on professional judgment, but is transparent and repeatable.

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

<sup>&</sup>lt;sup>1</sup> Typically, minor socio-economic effects are not considered to require mitigation or management action to either enhance benefits or control adverse impacts. Moderate and significant effects require cooperative and coordinated impact management on the part of the proponent, governments and affected populations. Moderate effects can typically be managed by such action to result in a range of outcomes acceptable to most key stakeholders. Significant effects require decisive management action to either reduce adverse or optimize beneficial impact outcomes.

For purposes of this Assessment, an effect is considered significant if:

" effects are highly distinguishable and result in strong concern or strong support among stakeholders or result in substantive changes in the well-being of residents in the primary Study Area."

## 2.6.6 Cumulative Effects

Socio-economic cumulative effects are those that result from the impacts of a proposed development in combination with other past, present or reasonably foreseeable future developments.

The approach used for cumulative effects assessment in this EA is comparable to those used for many other federal and provincial EIA projects. It follows four essential steps:

- Identifying through consultation and other means the valued socio-economic components that might be affected by the proposed development;
- Determining what other developments are included in the cumulative effects assessment (an exercise that culminates in a Project Inclusion list);
- Predicting the potential for cumulative socio-economic effects especially on the primary and employment catchment communities identified for the project including the relative contribution of the residual effects (i.e. effects remaining after mitigation) of the project to those cumulative effects; and
- Identifying ways of managing the combined impacts by way of mitigation, monitoring and follow-up management.

In a region such as Placentia Bay, several recent, current and reasonably foreseeable developments have been identified whose effects overlap and accumulate.

The EIS/CSR Guidelines require that the cumulative effects assessment include at least the existing refinery, and transhipment terminal and the proposed future projects including the LNG transshipment terminal and Long Harbour nickel plant and potential aquaculture sites.

Detailed methodology for cumulative effects assessment is described in Section 14, Cumulative Effects Assessment, of this volume.

# 3.0 REGIONAL AND PROVINCIAL ECONOMY

## 3.1 Introduction

Overviews of the provincial and regional economies are provided below as part of the context for the proposed Refinery Project. The effects of the Project on the economy (with a focus on the region) during construction and operation are discussed. Additional background and details can be found in the Socio-economic Component Study for the Refinery Project.

# 3.2 Existing Environment

## 3.2.1 The Provincial Economy

For hundreds of years, Newfoundlanders and Labradorians have relied upon traditional resource sectors, particularly fishing, forestry and mining, for economic survival. This has resulted in a high dependency on primary, if not single, industries. The population is sparse and rural-based, requiring ongoing social and economic supports. The Province also has experienced limited export opportunities, low-value-added production, and seasonal employment, which is, again, rural focused. Unemployment rates have remained relatively high and incomes are low compared to the rest of the country. The dependency on income transfers from federal and provincial governments is also chronically high.

This situation was aggravated in 1991 with the closure of the groundfish fishery, resulting in an economic downturn that has affected communities throughout the Province to this day.

Today the Province is facing new and increasing levels of global competition with lower employment and production costs and demonstrably higher productivity overall. With this increased competition in many resource industries, employers within some communities have closed their operations, with devastating results to the local economy.

The discovery of commercial offshore oil and gas reserves in the late 1970s provided a welcome source of economic relief for the Province.

## Economic Overview

In 2002 and subsequent years, Newfoundland and Labrador realized the fastest growing provincial economy in Canada. The Hibernia offshore oil field, which resulted in significant construction activity in the early 1990s, has provided for substantial capital investments in the province and generates major levels of employment. The Hibernia development was followed by the development of the Terra Nova and White Rose oil fields which again provide for substantial levels of employment, relatively high incomes and economic growth. By 2003, the oil and gas industry accounted for almost 18 per cent of provincial Gross Domestic Product

(GDP) and 2.7 per cent of total labour income in the province (Department of Finance, The Economy 2004).

By the early 2000s the development of the Voisey's Bay nickel mine in Labrador, combined with reactivation of previous known mineral sites due to new technologies and increased demand, breathed new life into the mining and minerals sector. Between 2002 and 2005, mining and oil and gas sectors were the greatest contributors to provincial GDP.

According to the provincial Department of Finance, GDP grew by 1.9 per cent in 2006. Most of this growth was supported by a 2.6 per cent increase in mineral exports and, to a lesser extent, increased government expenditures. Total capital investment for 2006 declined by 1.0 per cent to reach \$4.5 billion (Department of Finance, The Economy 2007). Table 3.1 provides baseline economic data and demonstrates the sustained growth in provincial GDP, capital investments and personal incomes that occurred between 1999 and 2006. Information on the contribution of specific industries to the province's GDP is found in the Socio-Economic Component Study for this project. A recent "flash sheet" of the province's economic health is provided in Table 3.2.

Year	1999	2000	2001	2002	2003	2004	2005	2006f
GDP (\$m)	12,184	13,922	14,179	16,457	18,186	19,473	21,486	23,513
% change	9.0	14.3	1.8	16.1	10.5	7.1	10.3	9.4
GDP (\$m chained 1997)	11,715	12,322	12,515	14,471	15,372	15,237	15,298	15,589
% change	5.5	5.2	1.6	15.6	6.2	-0.9	0.4	1.9
Personal Income (\$m)	10,651	11,122	11,576	11,927	12,447	12,835	13,316	13,869
% change	4.0	4.4	4.1	3.0	4.4	3.1	3.7	4.1
% change real	2.5	1.4	3.0	0.6	1.4	1.3	1.1	2.1
Retail Trade (\$m)	4,433	4,760	5,201	5,407	5,736	5,755	5,884	6,059
% change	8.1	7.4	9.3	4.0	6.1	0.3	2.2	3.0
% change real	6.8	3.6	8.9	3.4	4.4	-1.8	-1.1	0.9
Capital Investment (\$m)	3,611	3,399	3,371	3,361	3,712	4,243	4,576	4,530
% change	27.8	-5.8	-0.8	-0.3	10.4	14.3	7.8	-1.0
% change real	27.2	-7.9	-1.4	-2.0	10.9	11.2	6.3	-0.4

 Table 3.1
 Selected Economic Indicators Newfoundland and Labrador

Key:

GDP = Gross Domestic Product at Market Prices

CPI = Consumer Price Index

f = forecast

Source:

Statistics Canada; CMHC; Economics and Statistics Branch, Department of Finance, 2007

## Economic Outlook

The province is expected to continue realizing strong growth, and GDP projections for 2007 are estimated at a growth rate of 8.5 per cent. This growth will be supported by increased production at the Terra Nova field and higher oil and mineral exports. Newsprint and fish product exports are expected to hold steady at current levels. Personal incomes are expected to grow by 3.4 percent that will support increased retail and car sales. Housing starts are expected to decline due to shifting demographic patterns and a decreasing population. Employment growth will be 1.2 percent with most growth occurring in the service sector. Capital investment is expected to continue declining into 2007 by 7.6 percent as a result of reduced capital project expenditures (Department of Finance, The Economy 2007). Beyond 2007, provincial GDP is forecast to grow at an average annual rate of 0.8 percent.

Table 3.2	Flash Sheet Economic Indicators February 2007	

Category	Count
Population, February 2007	509,000
Labour Force, February 2007	241,200
Total Persons Employed (Adjusted)	218,300
Unemployment Rate (Adjusted)	14.3%
Gross Domestic Product (GDP) (millions \$, 2005)	21,486
Consumer Price Index (CPI), All Items, \$ millions	\$129.1
Percent Change Since February 2006	1.6
Gross Value of Manufacturing Shipments, \$ millions, January 2007	\$155.5

Source:

Newfoundland Statistics Agency, Government of Newfoundland and Labrador

Projections from 2007 to 2010 are provided in Table 3.3.

## 3.2.2 The Regional Economy

Activities associated with the ocean resources are vital to the economy of the Placentia Bay area and its communities, more so than many other areas of the province. Major industry in the area currently includes the North Atlantic Oil Refinery, the Marystown shipyard, Newfoundland Transshipment Facility at Whiffen Head, the marine terminal at Argentia, and fish plants and independent fisherman throughout area communities. Ocean-related activities contribute significantly to GDP, labour income and employment.

Contributions from ocean-related industries in Placentia Bay to GDP averaged about \$358 million annually from 2001 to 2004 and accounted for 50.3 per cent of the area's total GDP. Considering direct, indirect and induced impacts, the total oceans-related GDP in the Placentia Bay area is about \$454 million for the period and represents 63.9 per cent of the area's total

GDP compared to 41.3 per cent for the province as a whole.<sup>2</sup> As a component of the oceanrelated industrial sector, offshore oil production and development was the most significant contributor to total GDP, accounting for 46.3 per cent compared to 11.0 per cent for fishery harvesting and processing (Estimating the Value of the Marine, Coastal and Ocean Resources of Newfoundland and Labrador, 2005).

Year	2007f	2008f	2009f	2010f
GDP (\$m)	24,416	24,423	24,065	
% change	3.8	0.0	-1.5	
GDP (\$m chained 1997)	16,914	17,042	16,898	16,444
% change	8.5	0.8	-0.08	-1.5
Personal Income (\$m)	14,338	14,874	15,442	
% change	3.4	3.7	3.7	3.1
% change real	1.5	1.1	1.4	
Retail Trade (\$m)	6,213	6,395	6,6623	6,774
% change	2.5	2.9	3.6	2.3
% change real	2.1	2.0	2.4	1.1
Capital Investment (\$m)	4,185	3,992	3,882	4,084
% change	-7.6	-4.6	-2.7	5.2
% change real	-8.6	-5.5	-4.1	2.9

Key:

GDP = Gross Domestic Product at Market Prices;

CP I= Consumer Price Index

f = forecast

Source:

Statistics Canada; CMHC; Economics and Statistics Branch, Department of Finance, 2007

Direct employment associated with ocean-related activity in the Placentia Bay area averaged about 2,900 jobs from 2001 to 2004 or 29.1 per cent of total employment in the area. Considering direct, indirect and induced effects, ocean-related employment in the area is estimated to average about 4,500 jobs over this period and resulted in 45.6 per cent of the area's total employment being based on ocean-related activities, compared to 25 per cent for the province as a whole. In terms of the private sector, the most important industries are the

<sup>&</sup>lt;sup>2</sup> Direct impacts are labour income and business profits earned by workers and business owners working directly on a given activity or project; Indirect impacts are generated when other firms supply goods and services to the direct activity or project; and Induced impacts are generated when direct and indirect employees and business owners spend their incomes in other areas of the economy, which leads to increased retail sales, housing starts and so on.

fishery (harvesting and processing) and offshore oil activity (production and development). Fisheries and Oceans Canada accounted for the largest portion of the public sector contribution (Estimating the Value of the Marine, Coastal and Ocean Resources of Newfoundland and Labrador, 2005).

Total direct labour income from ocean-related activity in the area averaged about \$111 million annually from 2001 to 2004 representing 31.4 per cent of the area's total labour income. Considering direct, indirect and induced effects, ocean-related labour income averaged about \$191 million and accounted for 53.8 percent of total labour income, as compared to 27.2 per cent for the province as a whole. The most significant private sector industries, in terms of total labour income generated, were offshore oil (production and development) at 30.4 per cent and the fishery (harvesting and processing) at 17.8 per cent. Public sector activity contributed 1.4 per cent of labour income (Estimating the Value of the Marine, Coastal and Ocean Resources of Newfoundland and Labrador, 2005).

In addition to ocean-related industries, contributions to the regional economy also come from land-based sources, such as the provision of government services at all levels, including health care and education.

One of the factors considered in the feasibility study for a second refinery in Placentia Bay was the extent of relevant infrastructure already in place, particularly in the Southern Head area. Companies are already in place to service and support the existing crude oil refinery and the oil transshipment terminal, and they could expand to support a second refinery. There are fabrication yards and experienced workforces in place at Bull Arm, Marystown and Cow Head. These facilities have successfully supported a number of complex industrial projects and offer the potential for synergies in the future.

The Bull Arm Fabrication site is an industrial complex, containing a dry dock and a construction and fabrication-site; a topsides fabrication and assembly facility; and a large industrial area with administrative offices, laydown areas, quay and an offshore deepwater site. Marystown Shipyard and the associated Cow Head facility are located in Marystown. Cow Head is an established offshore fabrication facility with a large L-shaped dock, deep water and several interconnected buildings for outfitting and assembly of major components and modules.

In addition, a significant level of potential economic activity in Placentia Bay is under active planning, the details of which were outlined at a Newfoundland and Labrador Environmental Industry Association workshop in May 2007. Projects currently undergoing environmental assessment include the proposed refinery, a proposed LNG transshipment terminal and a nickel processing facility. In addition, there is an increase in aquaculture and the possibility of several major projects at the Marystown facilities.

# 3.3 Project Effects

## 3.3.1 Background

The proposed refinery will be the first refinery built in Canada since 1984. It represents a significant increase in refinery capacity for Canada (by over 14 per cent), particularly eastern Canada (by almost 62 per cent). Its initial output will be three times that of the North Atlantic refinery at Come by Chance.

The proposed new refinery will be a state-of-the-art facility using the best available technology economically achievable in design, construction and operations to meet or exceed engineering and environmental management standards and practices. Engineering and environmental management work is being sourced through Canadian companies that will allow them to enhance their skills, experience and know-how to compete internationally for similar work. Capital equipment will be procured worldwide with local and Canadian companies contracted to complete much of the required fabrication work and installation and to undertake the various infrastructure support projects.

The refinery will augment existing industrial fabrication, refining, oil storage and environmental and marine management infrastructure in the Study Area. This in turn has the potential to attract and support further related industrial activity in the region, including the use of natural gas from Newfoundland and Labrador's offshore fields to fuel the region's refineries. Natural gas will have the added benefit of providing a cleaner fuel to reduce greenhouse gas emissions and other pollutants and to allow the refineries to sell all those by-products currently used for their own fuel requirements.

As a new capital undertaking, the refinery will be a large-scale industrial project requiring an investment of approximately \$4.6 billion over five years and, as a result, will expand the economic output of Newfoundland and Labrador, and of Canada as a whole. It will generate significant business activity for the Province and for other regions of Canada. This level of spending will support various domestic firms, create additional employment within Newfoundland and Labrador and across Canada, increase household incomes and benefit several of the provincial and federal treasuries.

For the period of the refinery's operations, expected to continue minimally for 25 years but most likely will be longer based on the economic life of most refineries in North America through refit, expansion, upgrade, etc., Canada will benefit from the ongoing economic activity associated with a 300,000 bpd facility and will be recognized internationally as a stable and reliable source of petroleum products to serve North American and European markets.

### 3.3.2 Project Phases

#### Planning and Pre-construction

This phase of the project entails engineering design, environmental assessment and business development and financing. This phase started in 2006 and is ongoing. Direct expenditures for this phase are estimated to be upwards to \$30 million including spending on professional services in engineering and environmental assessment along with spending on business development costs. The proponent is utilizing a combination of local companies and national and international specialty firms with local subcontractors for the engineering and environmental assessment work.

## Phase 2: Construction of Supporting Infrastructure

This phase of the project entails engineering design of the plant, procurement of services for construction of the project site, roadways, electrical transmission, marine infrastructure and other support infrastructure, including the oil storage tanks. This phase starts in 2007 and will continue to 2011. Expenditures for this phase are estimated to be upwards to \$2.3 billion USD including spending on roadways, a wharf, tug basin, jetty, oil tanks and electrical transmission facilities to provide 170 megawatts of power. Most of the work in this phase is to be completed by local subcontractors and local firms.

## Phase 3: Construction of the Refinery Plant

This phase of the project entails procurement of services, materials, machinery and equipment for and construction of the plant. This phase starts in 2008 and will continue to 2011. Expenditures for this phase are estimated to be upwards to \$2.3 billion. Two major components of this work will be completed either by skilled tradespeople working on the construction activities or by local firms undertaking modular fabrication of construction materials for the plant and tank farm. Approximately 10,000 tonnes of materials will be utilized. Approximately 90 percent of the purchased machinery and equipment will be manufactured outside of the province and procured for the plant either directly or through local representative firms.

#### Phase 4: Refinery Operations

This phase of the project entails the ongoing processing operations of the refinery for a minimum of 25 years beginning in 2011. While the design life is 25 years, the actual operating life of the refinery is anticipated to be much longer with refits, upgrades, and possible expansion. Annual production will be 105,000,000 bbl/year. Operating expenditures for this phase are estimated to be upwards of \$500 million annually, excluding purchase of feedstock. On an annual basis there will be 400-450 crude oil tankers, product tankers and bulk carriers

loading and unloading crude oil and refined product at the refinery's marine facility. Over the course of the refinery's operating life, an undefined amount of capital equipment upgrades will be required to meet operational performance objectives and to keep pace with changing emission standards, particularly with regard to the reduction of greenhouse gas emissions.

## Phase 5: Decommissioning

This stage of the project entails the phase-out of crude oil refining, the decommissioning of the plant and oil storage tanks, sale of re-useable machinery, equipment and plant assets and the management of the site to return it to its pre-existing use condition. Estimated annual expenditures are in the range of \$45 million to \$50 million annually and are separate from the aforementioned project cost estimate. Based on the design of the state-of-the-art plant and employment of current environmental standards, environmental remediation work for site reclamation is expected to be minimal. Although the life of the facility is planned as 25 years, the lifespan of most oil refineries is generally greater.

## 3.3.3 Contribution to the Economy

The Project will have immediate and long-lasting impacts on the provincial and regional (local) economies and will also have an impact on the national economy. The impacts are described below.

The estimated capital investment of \$4.6 billion will support new economic activity in the province and most importantly will not be competing with other oil industry investments in the province. Over thirteen million person hours of employment will be generated from this investment, with approximately 50 percent of this labour to be sourced provincially; the balance to be generated outside the province primarily in other regions of Canada.

Through this investment, the Project will generate direct, indirect and induced economic impacts. The *direct* economic impacts represent what is referred to as the "first round of spending" and consist of the expenditures that are required to support the outputs - in this case, building the refinery and operating it over a 25-year period.

*Indirect* impacts result from the "second round of spending" that occurs when the payments received from the proponent are re-circulated in the provincial economy. This includes, in large measure, contractor and supplier spending and that of the refinery's employees.

*Induced impacts result from the* "third round of spending" as recipients of the money spent by contractors, suppliers and employees, in turn, spend their money.

Multipliers are a commonly-applied approach for estimating the economic impacts generated by the various rounds of spending as dollars are circulated and re-circulated. They are estimates

only and vary by geography, industry and commodity. Multipliers generally are expressed in terms of the overall contribution to a province's Gross Domestic Product (GDP), labour income and employment.

Multipliers are developed based on a range of input data and many considerations are factored into the calculations to ensure impacts are not overstated. The multipliers used for this assessment reflect best estimates Project expenditures at the time of the analysis and rely heavily on the data supplied by the Economic and Statistics Branch of the Newfoundland and Labrador Department of Finance. The Department has analyzed various large industrial projects for their economic impacts and used Statistics Canada, other data and results of other economic impact analysis to arrive at appropriate multipliers for this Project. As well, comparisons of methodology and results have been made with other similar economic impact studies for refineries, mine development and offshore petroleum development projects undertaken in the province and elsewhere in North America.

Generally, a multiplier of 1.3 of direct expenditures and employment can be applied in calculating indirect and induced economic impacts; however, it is realized that not all of the refinery project's purchases of goods and services are sourced from within the province. Although a precise breakdown of expenditures from within and outside the province is not available at the present stage of project development, NLRC has made various assumptions, based on its knowledge of the sector and the capacity of local firms, on the source of goods, services and labour for each phase of the project. Based on this data, appropriate multipliers were applied to calculate the indirect and induced impacts using the information supplied by the Department of Finance.

As Table 3.4 outlines, factoring-in all the direct expenditures along with the indirect and induced impacts, the one-time cumulative impact to the provincial economy for the period 2007–2011 for the pre-operation phases is approximately \$4.3 billion, with substantial positive impacts on employment levels and incomes. These are conservative estimates, recognizing that a significant portion of the economic activity resulting from this project may reside elsewhere in Canada.

2007-2011	Direct Expenditure Impacts	Indirect and Induced Impacts	Total Economic Impacts
Employment	9,108 person years (or 1,822 annual average)	19,582 person years (or 3,916 annual average)	28,690 person years (or 5,738 annual average)
Incomes	\$ 726.4 million	\$ 1,016.9 million	\$ 1,743.3 million
Provincial GDP	\$ 1,380 million	\$ 2,925.6 million	\$ 4,305.6 million

#### Table 3.4 Short-Term Economic Impacts of NLRC Refinery Project

The *ongoing* economic benefits to the provincial economy generated by the refinery project are shown in Table 3.5 as they relate to the operation of the facility over a 25-year period, along with the decommissioning phase, estimated to be two years. In fact, it is expected that the refinery will operate for a much longer time period so this is a conservative estimate. However, on the basis of a 25 year project, for the operating phase, the cumulative impact to the economy is estimated at approximately \$1.4 billion annually (or \$35 billion in total over 25 years based on a straight-line calculation), supplemented by increased knowledge, skills and potential economic activity in a range of related industrial sectors. Table 3.5 outlines these impacts.

#### 3.3.4 Summary Table

Table 3.5 following provides an assessment summary of the economic impacts of the Project.

Economic Impact VEC	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Level of Confidence	Certainty	Mitigation Or Enhancement Success	Significance
Economy (Construction)	Positive	High in Study Area, Medium provincially	Provincial	Medium-Term	Continuous	NA	High	High	Highly Effective	Major
Economy (Operations)	Positive	High in Study Area, Medium provincially	Provincial	Long-Term	Continuous	NA	High	High	Highly Effective	Major
Disposable income (Construction)	Positive	High in study Area, Medium – Low provincially	Regional	Short-Term	Continuous	NA	High	High	NA	Major
Disposable income (Operations)	Positive	High in study Area, Medium – Low provincially	Regional	Long-Term	Continuous	NA	High	High	NA	Major
Income disparity (Construction)	Adverse	Low-Medium	Local	Medium-Term	Intermittent or Continuous	Yes	Medium	Medium	NA	Minor
Income disparity (Operations)	Adverse	Low-Medium	Local	Medium-Term	Intermittent or Continuous	Yes	Medium	Medium	NA	Minor

Table 3.5Economic Impacts

## 3.3.5 Construction

The residual effect of this project on the economy is positive and the magnitude will be high within the Study Area and medium for the province. The geographic extent of the economic benefits will be provincial with an emphasis on the Study Area and will be medium-term for the Study Area as well as for the province. The economic benefits will occur continuously over the medium-term resulting in a positive economic boost to the Study Area. The level of confidence in this project being a positive to the local and provincial economy is high, as is the certainty of the benefits occurring. Mitigation success will be highly effective in terms of ensuring that the economic benefits flowing from construction activity are spread through out the Study Area, the Employment Catchment Area and the province as a whole. The economic terms will be significant in that the project will provide direct, indirect and induced economic benefits throughout the Study Area and the province.

Increased average disposable income for households will be another positive effect. It will be of high magnitude within the Study Area and Employment Catchment Area, depending on the individual community, medium to low throughout the rest of the province and primarily regional in extent. The effect will be short-term and the frequency will be continuous for the period in which it occurs. And since having an increased income is positive, there is no need for the economy to be returned to its original state. Since these construction jobs are continuous rather than seasonal, a high level of confidence is assigned to this prediction of increased income, with a high level of probability that the positive effect of having an increased average disposable income will occur and, therefore, no mitigation is required. The effect is expected to be significant.

The residual effect on the economy identified as increased income disparity among households could be adverse to those on a fixed income, of low or medium magnitude depending on the individual community, and local in extent. The effect would be medium-term as opportunities would open up for some people who are not retired, intermittent or continuous, and reversible. A medium level of confidence is assigned to this prediction and there is a medium level of probability that the effect will occur. The effect is expected to be of minor significance.

## 3.3.6 Operations

The residual effect of this project on the economy is positive and the magnitude will be high within the Study Area and medium for the province. The geographic extent of the economic benefits will be provincial with an emphasis on the Study Area and will be long-term for the Study Area as well as for the province. The economic benefits will occur continuously and last for many decades, and the economy should be more positive than its current state within the Study Area. The level of confidence in this project as a boost to the local and provincial economy is high, as is the certainty of the benefits occurring. Mitigation success will be highly effective in terms of ensuring that the economic benefits are spread throughout the Study Area

as well as the Employment Catchment Area and the province as a whole; the economic significance will be significant in that the project will provide direct, indirect and induced economic benefits throughout the Study Area and the province.

Increased average disposable income for households will be another positive effect of the Project. It will be of high magnitude within the Study Area and Employment Catchment Area, depending on the individual community, and medium to low throughout the rest of the province and primarily regional in extent. The effect for operations will be long-term and the frequency is continuous. And since having an increased income is positive, there is no need to want the economy to be returned to its original state prior to the project. Assuming the project proceeds, a high level of confidence is assigned to this prediction of increased income, with a high level of probability that the positive effect of having an increased average disposable income will occur and, therefore, no mitigation is required. The effect is expected to be significant.

The residual effect on the economy, identified as increased income disparity among households, could be adverse to those on a fixed income, of low or medium magnitude depending on the individual community, and local in extent. The effect would be medium-term as opportunities would open up for some people who are not retired; intermittent or continuous, and reversible. A medium level of confidence is assigned to this prediction and there is a medium level of probability that the effect will occur.

## 3.4 Monitoring and Follow-Up

As part of Newfoundland and Labrador Refinery's commitment to socio-economic monitoring, the company will compile statistics on training and workforce development, employment, business and procurement, all of which will contribute to a healthy, growing economy providing that the mitigation measures are implemented.

The Government of Newfoundland and Labrador will also monitor the contribution of the project to the economy through its ongoing compilation of economic data by the Department of Finance.

# 4.0 EMPLOYMENT AND BUSINESS

# 4.1 Existing Environment

The population of the province as a whole, as well as in the Study Area, is largely rural. Rural areas of the province continue to face systemic challenges associated with seasonal employment, low incomes and a high dependency on government transfers. Rural areas are also highly dependent on resource-based industries in which fluctuations can cause serious economic challenges.

Limited population data is available from the 2006 Census and detailed labour market information will not be available until 2008. However, recognizing the need to understand the dynamics of the provincial, regional and municipal labour pool, the provincial Department of Human Resources, Labour and Employment undertook an initiative with the public and private sectors to develop a comprehensive report on regional labour markets. This report, *All the Skills to Succeed, Report of the Newfoundland and Labrador Skills Task Force 2007,* provides an important and timely source of information for the Project assessment.

## 4.1.1 Labour Market Trends

Sustaining future labour supply poses a number of challenges for the province. Demographic trends demonstrate that the population is both declining and aging, as a result of low birth rates, increased out-migration and other factors. These same projections demonstrate that the labour force will shrink as older workers, now aged 55-64, retire over the coming decade.

A number of broad trends occurring within the province are creating challenges for the population and ultimately the labour pool. The most notable of these trends is the overall decline and aging of the population, the result of a declining birth rate (already the lowest in the country), increasing levels of out-migration and low levels of immigration.

Overall, the population decreased by 11 per cent between 1991 and 2004 compared to an 11 per cent increase nationally (Newfoundland Statistics Agency, 2005). This loss was concentrated among the 0-19 age group, which saw a decline of 29.4 per cent (Demographic Change: Newfoundland and Labrador Issues and Implications, Government of Newfoundland and Labrador, 2002). Population changes in the regions nearest the Project are shown in Table 4.1.

	Province	Clarenville- Bonavista	Burin Peninsula	Avalon Peninsula
Population				
Population, 2001				
Total	512,930	29,955	23,640	235,125
Males	249,080	14,995	11,670	113,700
Females	258,995	14,960	11,970	121,425
Population 2004, Total*	505,469	28,689	21,669	235,125
Population Change 1991-2006 (%)	-12.1	-20.1	-25.0	-2.4
Number of Communities	593	86	40	118

Table 4.1	Population Data
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Source:

Census 2001, Statistics Canada; Community Accounts; Labour Market Indicators and Trends, HRLE \*2006 Census data is unavailable by Rural Secretariat regions.

While the population is growing older throughout Canada, this province has the most rapidly aging population in the country and will likely experience skills shortages and labour pressures earlier than elsewhere in the country (Department of Human Resources, Labour and Employment, 2007).

The aging of the provincial population is also a significant trend impacting on a host of economic and social issues. Of concern is the inevitable declining workforce size as workers retire and the population of young people is insufficient to replace existing workers.

Labour markets in the province face continuing challenges associated with rural economies, limited industries, seasonal employment and a high reliance on income transfers. Despite the economic growth and a decline in unemployment rate, overall employment levels remain low relative to other Canadian and Atlantic economies. Table 4.2 provides baseline economic indicators respecting provincial labour market activity for 1997-2005 as well as projections into 2009, which suggest there could be an increase in the labour force and employment levels that reflect expectations that NL residents will return to the province once work becomes available.

Table 4.3 shows the levels of interprovincial in-migration, out-migration and net migration between 1999 and 2006 that clearly demonstrates how in-migration levels have not kept pace with out-migration.

Migration from rural communities to larger municipal centres, particularly the St. John's CMA, has become more prevalent since 2003 and has contributed substantively to the growth of communities such as Mount Pearl, Paradise and Conception Bay South. Migration to other parts of the country is also common as pursue opportunities for employment and higher wages. In recent years, as result of the decline in the fishery, a general decline in the economic health of smaller communities has occurred through out-migration. As a result, some regions of the province have experienced net out-migration population loss (Table 4.1).

	1999	2000	2001	2002	2003	2004	2005	2006f	2007f	2008f	2009f
Labour Force (000's)	241.9	237.8	242.7	248.5	254.1	254.3	252.5	253.1	254.4	256.0	257.9
% change	3.2	-1.7	2.1	2.4	2.3	0.1	-0.7	0.2	0.5	0.6	0.7
Employment (000's)	201.0	198.0	203.8	207.2	212.3	214.3	214.1	215.7	218.0	221.3	224.5
% change	4.5	-1.5	2.9	1.7	2.5	0.9	-0.1	0.7	1.1	1.5	1.4
Unemployment Rate (%)	16.9	16.7	16.1	16.7	16.5	15.7	15.2	14.8	14.3	13.6	13.0
CPI (1992=100)	110.0	113.3	114.5	117.3	120.7	122.9	126.1	128.4	130.6	133.1	135.6
% change	1.5	3.0	1.1	2.4	2.9	1.8	2.6	1.8	1.7	1.9	1.9
Housing Starts	1,371	1,459	1,788	2,419	2,692	2,870	2,498	2,234	2,024	1,976	1,992
% change	-5.4	6.4	22.5	35.3	11.3	6.6	-13.0	-10.6	-9.4	-2.4	0.8

 Table 4.2
 Labour Market Indicators Newfoundland and Labrador 1997-2009(f)

Key:

GDP = Gross Domestic Product at market prices

CPI = Consumer Price Index

f = forecast

Table 4.3	Interprovincial	Migration	1999-2006
	into provinional	mgradon	1000 2000

	1999-2000	2000- 2001	2001- 2002	2002- 2003	2003- 2004	2004- 2005	2005- 2006
Interprovincial In- migration	8,400	7,499	8,784	9,198	8,397	8,213	10,544
Interprovincial Out- migration	12,663	11,992	12,136	10,881	10,424	11,923	14,912
Interprovincial Net Migration	-4,263	-4,493	-3,352	-1,683	-2,027	-3,710	-4,368

Source:

NL Statistics Agency 2007

Research indicates that the vast majority of people leaving are youths aged 15-25, accounting for 88 percent of the net reduction in the workforce over the past five years (Department of Human Resources, Labour and Employment, 2007). As well, since 1996, a greater percentage of higher-educated workers are leaving the province: between 1996 and 2001, 19.1 per cent of out-migrating people had university degrees and 37.0 per cent had post-secondary certificates or diplomas. The percentage of out-migrating people with high school and lower education declined during these same periods.

The province is experiencing increased immigration of people with higher levels of education but not in sufficient numbers to overcome out-migration. As a result, the province is realizing a net loss of people with higher education. Top occupations of out-migrants are: sales and services; secretaries, administration and clerical; processing and manufacturing (other); and equipment operators and labourers (Department of Human Resources, Labour and Employment, 2007).

Provincial data predict a rapid decrease in new labour market entrants, and that over the next 15 years, ". . . there will be only one new labour market entrant for every two potential retirees . . . " (Department of Human Resources, Labour and Employment, 2007). This will create significant challenges in terms of sustaining business and economic growth and supporting new project initiatives in the future. Low literacy rates, particularly among the older age groups in rural areas, also present challenges.

To address these labour challenges, the provincial government commissioned a task force in 2006 to consider the future demand for skilled tradespeople and the ability of the provincial workforce to respond to these demands (All the Skills to Succeed, March 2007). The Task Force also considered the cumulative demand for labour that would be generated as a result of several large-scale projects, some already in operation (Hibernia, Terra Nova, White Rose and IOC mining operations) and other new projects that are well advanced into the planning stage (Voisey's Bay Nickel Company, the development of the Hebron oil field and the Lower Churchill Project). A detailed analysis of the cumulative demand for labour is discussed in Section 15, Cumulative Effects.

## 4.1.2 Labour Force Profile in the Project Area

## **Population Profile**

The population of the Study Area fell from 19,337 in 2001 to 18,424, representing a 4.7 percent decrease. With the populations of Placentia and Marystown removed, the population of the Isthmus communities (including Clarenville) increased by 1.5 percent over the five-year period. This increase can be mainly contributed to the 3.3 percent increase in Clarenville (due mainly to people from communities on the Bonavista Peninsula moving into this growing service centre).

Excluding Clarenville, the nine closest communities to the proposed site had an average population decrease of 2.1 percent between 2001 and 2006. The populations of Marystown and Placentia have decreased significantly since 2001, down 8 percent and 11.9 percent respectively as a result of low levels of activity at some of the major industries (e.g. Marystown Shipyard, Cow Head Fabrication Facility).

Due to its more diversified economy, the Avalon Peninsula has experienced less of a population decline than all other areas of the province, losing only 3.4 percent of its population between 1996 and 2001. Migration from many of the smaller communities within the Study Area to the St. John's region has minimized the overall population drop of the Avalon.

Table 4.4 provides population data for some of the communities in the Clarenville-Bonavista and Burin Peninsula Regions and provides recent 2006 census data. This gives an accurate account of population changes since 2001 at the community level, as well as the overall rate of migration albeit for 1996-2001. As demonstrated, populations in the core project region are

declining at fairly substantial rates. It is not known with any certainty where these people have gone – some would have gone to the Avalon region, others to Alberta and other provinces – and some would likely return to the province should work become available. This issue will be addressed further in the report.

The population loss in the Isthmus area is attributed to lack of employment opportunities in the traditional industries (e.g., fishing and fish processing) as well as the closure of some of the larger industries in the immediate area (e.g., ERCO at Long Harbour, Bull Arm Fabrication-site) and the current draw of other better economies, such as Alberta.

In the Clarenville-Bonavista region the working age population has declined by more than 10 per cent since 1996 and on the Burin Peninsula by almost 13 per cent. It is estimated that these areas will realize declines of 29.5 per cent and 19.7 per cent respectively by 2021. Strategies to address the associated challenges are now being considered by government, labour, educational institutions and other stakeholders.

Looking at labour markets from a regional perspective is a valuable exercise for large-scale industrial projects. The province has developed a very mobile workforce and commuting to a place of work outside of one's community, even as much as 160 km per day, is not uncommon. By examining the labour pool from a regional perspective, as opposed to individual communities, project managers can consider the availability of labour on a larger and more comprehensive scale.

## Workforce Mobility Patterns

Mobility of the workforce is demonstrated by the information on commuting between home and workplace as presented in Table 4.5.

As shown in Table 4.5, in 2001, 43.6 percent of the Clarenville-Bonavista and 33.2 per cent of the Burin Peninsula worked in a different community from where they lived, comparable to a 43 per cent rate for the Avalon. On average, workers commuted 51.5 kms per day to and from their place of work, with Clarenville-Bonavista and Burin workers travelling an average of 77 to 80 kms each day.

For this reason, when considering the labour force in any particular region, it is reasonable to consider the labour pool within a radius of 50 km or more. Within a 50 km radius of Marystown, the working population, ages 25-54, is 6,550 (Department of Human Resources, Labour and Employment, 2007). Within the 50 km radius of Clarenville the workforce is estimated at 6,590.

	Sunnyside	Arnold's Cove	Swift Current	North Harbour	Clarenville	Marystown	Southern Harbour	Come By Chance (Goobies)	Placentia
Population 2006	477	1,024	671	510	5,274	5,436	474	260	3,898
Population 2001, Total	490	1,060	692	511	5,104	5,908	591	265	4,426
Population Change 2001-06 (%)	-1.5	-2.1	-3.0	-0.02	+3.3	-8.0	-19.8	-1.9	-11.9
Migration Rate, 1996- 2001 (%)	-0.9	-	8.2	-10.9	+5.8	-10.1	-15.3	-4.0	-

Table 4.4	Community	Populations
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Notes:

Swift Current includes Garden Cove

Southern Harbour includes Little Harbour East

Placentia Includes Dunville, Freshwater and Jerseyside

Source:

Census 2006, Community Profiles, Statistics Canada

	Province	Clarenville- Bonavista	Burin Peninsula	Avalon Peninsula
People Usually Travelling to Other Communities for Work:				
Number Percent	51,788	3,065 43.6	1,690 33. 2	35,330 43.0
Average Distance Travelled for Work for People Outside Community (One Way), 2001	51.5 km	77.2 km	80.5 km	48.3 km
Primary Economic Centres		-Clarenville -Arnold's Cove -Sunnyside -Come By Chance -Bonavista	-Marystown -Burin	-St. John's -Mount Pearl -Conception Bay South
Migration rate (%)	-5.1	-4.2	-1.6	-2.7

Table 4.5	Work Mobility Patterns
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Source:

Department of Human Resources, Labour and Employment, 2007.

Within each region major economic "hubs" (i.e., sales and service communities) also provide significant employment to people in surrounding communities and act as core centres for employment. On the Burin Peninsula two centres capture much of the workflow: Marystown and Burin. In the Clarenville-Bonavista region the main employment communities are Clarenville, Bonavista, Arnold's Cove, Sunnyside and Come By Chance.

For the purposes of this Project, information from three regions is most pertinent: Clarenville-Bonavista, the Burin Peninsula and the Avalon Peninsula. These areas will be referred to as the "core project regions".

## Labour Force Education

Table 4.6 provides baseline statistics for educational levels in the province compared to the Canadian average.

Selected Indicators	Newfoundland and Labrador	Canadian Average
Full time post-secondary enrolment as percent of population, ages 15-24, 2004	25.7	24.2
Percent of working age population who have completed high school, 2004	67.0	75.6
Percent of working age population who have completed university, 2004 (25+ years)	9.9	17.2
Percent university enrolment in biology, physical sciences and engineering, 1999	18.6	19.6

#### Table 4.6 Selected Indicators for Education

Source:

Statistics Canada; Strategic Partnership Secretariat, Government of Newfoundland and Labrador. June 2005.

When data for highest levels of schooling are aggregated for the Study Area communities, they show that a majority of the population aged 15 years and older do not have a high school diploma (5,610 people or 44 percent), followed by those with a trade or non-university diploma or certificate (3,845 people or 30 percent). The high number of people without high school in these communities could be accounted for by the fact people aged 15 - 19 years of age are likely still attending high school and are included in these statistics (Figure 4.1).



Figure 4.1 Highest Level of Schooling for Primary Study Area Communities

As noted, levels of education vary within the province with rural areas realizing lower gains. The highest provincial level of education is concentrated in major urban areas of the Avalon Peninsula. Table 4.7 provides educational attainment levels for the provincial workforce ages 25-54 within the core project regions based on 2001 census data. These numbers have improved substantially over 1996 levels and it is anticipated that 2006 Census data will demonstrate further gains.

	Province	Clarenville- Bonavista	Burin Peninsula	Avalon Peninsula
Percent of Population Ages 25-54 With Less than High School	30.8	38.6	39.8	22.9
Percent of Population Ages 25-54 With High School Diploma	9.3	11.2	7.8	12.0
Percent of Population Ages 25-54 With Post-Secondary Certificate or Diploma	40.0	35.0	41.3	42.3
Percent of Population Ages 25-54 With University Degree	12.8	8.1	6.9	18.0

Table 4.7:	Highest Level of	Education, Ages 2	5-54 Years, by Region
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Source:

Department of Human Resources, Labour and Employment, 2007.

Table 4.8 provides educational attainment for the total population and by gender in the respective areas. The Burin Peninsula has a relatively high level of people who hold a certificate or trades diploma, indicating the influence of the Marystown Shipyard and the nearby CNA, but also the highest level of the core working population with less than high school.

Table 4.8	Highest Level of Education, Total Population, by Region, 20	001

	Province	Clarenville- Bonavista	Burin Peninsula	Avalon Peninsula				
Total Population With Less than High School	ol, 2001 (%)	-	-	_				
Males	42.1	50.7	48.3	34.3				
Females	42.6	51.9	51.8	34.4				
Total Population With High School Diploma, 2001 (%)								
Males	9.0	9.0	7.0	9.6				
Females	9.8	12.0	9.3	8.9				
Total Population With Post								
Males	30.4	27.3	33.0	31.5				
Females	28.7	23.3	26.4	31.9				
Total Population With University Degree, 20	Total Population With University Degree, 2001 (%)							
Males	9.5	5.2	5.5	13.5				
Females	9.6	5.5	5.2	13.7				

Source:

Census 2001, Statistics Canada; Available through Community Accounts

\*Includes Dunville, Freshwater and Jerseyside

Education levels also vary by community, as demonstrated in Table 4.9. Larger communities within each of the regions generally indicate higher levels of education.

	Sunnyside	Arnold's Cove	Swift Current	North Harbour	Clarenville	Marystown	Southern Harbour	Come By Chance	Placentia*	Garden Cove	Little Harbour East
Less than High School (%)	69.5	52.4	52.2	73.9	39.4	40.8	50.0	38.2	45.2	36.4	53.6
High School Diploma Only(%)	-	9.5	4.3	-	8.4	8.3	8.0	14.5	9.4	9.1	25.0
College / Trades (%)	14.6	22.6	32.6	13.0	30.1	30.6	35.0	40.3	35.2	36.4	14.3
Bachelor's Degree or Higher (%)	3.7	3.6	-	-	11.5	7.3	-	3.2	1.8	13.6	-

 Table 4.9
 Highest Level of Education, Total Population, by Select Communities, 2001

Source:

Community Profiles, Education Accounts, 2001. Government of Newfoundland and Labrador

Levels of education have been increasing, notably among the youth population, the group with the highest propensity to relocate outside the province. Increased education among older workers is not occurring and concerns exist that these workers will not be able to develop their skill sets to meet current employer demands. Industry consultations also indicate the technical skills of the provincial labour force are lacking and industrial sectors are facing increasing challenges in recruiting and retaining skilled workers (Department of Human Resources, Labour and Employment, 2007). Table 4.10 provides core statistics for the province, and the project regions. As demonstrated, the working population as a percent of the total population is fairly uniform at approximately 60 percent. Both the Clarenville-Bonavista and Burin Peninsula regions have experienced substantial declines in working populations 1991-2006 and further declines are forecasted for the 2006-2021 period. This is a result of out-migration fuelled by the decline in traditional industries, notably the fishery and associated processing.

	Province	Clarenville- Bonavista <sup>3</sup>	Burin Peninsula	Avalon Peninsula
Total Labour Force 2005, Total	253,100 <sup>4</sup>	52,700	17,600	129,700
Working Age Population (Ages 20-64), 2006 Number Percentage	- 64.8%	- 63.8%	- 65.6%	- 62.6%
Percent Change in Working Population 1991- 2006	-3.1%	-10.4%	-13.3%	+7.7%
Projected Change in Working Population, 20-64 Yrs, 2006-2021 (%)	-14.6%	-19.7%	-29.5%	-8.5%
Median Age of Workforce, 2004 (Years)	49.3	42.5	49.8	40.3
Total Participation Rate, 2005 (%)	58.8%	54.4%	51.2% <sup>5</sup>	62%
Unemployment Rate (Adjusted), Feb. 2007	14.3%	19.%6 <sup>6</sup>	25.3% <sup>7</sup>	11.8%
Average No. of Weeks Worked, 2000	36.9	32.8	31.8	40.2

Table 4.10 Labour Market Da
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Source:

Labour Force Survey, Statistics Canada; Labour Market Indicators and Trends: Labour Market Development Division, Department of Human Resources, Labour and Employment. Winter 2007

<sup>&</sup>lt;sup>3</sup> Economic Region: Notre-Dame-Central-Bonavista

<sup>&</sup>lt;sup>4</sup> 2006 Data Census data

<sup>&</sup>lt;sup>5</sup> Economic Region 1020: South Coast-Burin Peninsula

<sup>&</sup>lt;sup>6</sup> Economic Region: Notre-Dame-Central-Bonavista

<sup>&</sup>lt;sup>7</sup> Burin Peninsula and South Coast

### Labour Force Participation

In each of the regions some communities experience higher employment opportunities than others because of their industrial base and/or their role as regional centres providing a more comprehensive range of business, social and personal services. This is demonstrated by Table 4.11, which shows higher levels of participation and employment in Come By Chance, Arnold's Cove, Clarenville, Marystown and Sunnyside than other communities in the region.

Employment is provided in a broad range of industrial sectors. Table 4.12 provides total employment levels across all sectors of the economy from 1999 to February 2007. Growth in many sectors has been sustained in recent years consistent with progress in the oil and gas industry, construction work and the goods-producing sector.

Data presented in Table 4.13 provides the distribution of workers by gender and industry occupation within the Study Area.

	Sunnyside	Arnold's Cove	Swift Current	North Harbour	Clarenville	Marystown	Southern Harbour	Come By Chance	Placentia
Labour Force									
Male									
Female	140	290	150	65	1,370	1,225	150	115	1,005
	70	250	120	40	1,260	1,050	115	80	825
Employment Rate, 2001									
% Males	40.9	68.7	37.7	50.0	60.2	45.6	42.3	72.7	38.3
% Females	37.3	56.0	34.0	21.1	52.6	44.1	25.0	57.1	37.5
Unemployment Rate, 2001									
% Males	35.7		22.6		16.0	29.8	27.6	11.1	36.1
% Females	17.6	7.7	29.2	50.0	13.6	16.6	54.2	0.0	19.9
Participation Rate, 2001									
% Males	63.6	69.9	50.8	50.0	71.7	65.0	55.8	81.8	59.9
% Females	43.6	61.9	45.3	2.1	60.8	53.2	50.0	57.1	46.8

 Table 4.11
 Community Employment, Unemployment and Participation Rates 2001(%)

Notes:

Swift Current includes Garden Cove

Southern Harbour includes Little Harbour East

Placentia Includes Dunville, Freshwater and Jerseyside

Source:

Census 2001, Community Profiles, Statistics Canada

Industry	1999	2000	2001	2002	2003	2004	2005	2006	Feb. 2007
All Industries	201.0	198.0	203.8	207.2	212.3	214.3	214.1	215.7	203.0
Goods-Producing Sector	46.8	43.0	43.7	42.6	42.2	47.7	49.0	49.1	36.8
Agriculture	1.1	1.0	1.0	1.1	1.5	1.3	2.2	1.9	1.0
Forestry, Fishing, Mining, Oil, & Gas	14.5	14.4	14.0	13.8	14.5	15.6	15.2	16.4	14.3
Fish Harvesting	8.3	8.3	6.8	7.6	7.9	8.3	8.8	8.2	6.8
Utilities	2.2	1.6	2.4	2.5	2.1	2.0	2.4	2.2	1.5
Construction	11.4	10.9	10.5	9.3	9.5	11.7	12.4	12.9	9.2
Manufacturing	17.5	15.2	15.8	16.0	14.6	17.2	16.8	15.7	10.8
Fish Processing	8.1	6.0	6.9	7.2	6.0	7.8	7.0	6.7	2.1
Services-Producing Sector	154.2	155.1	160.0	164.6	170.1	166.6	165.0	166.6	166.3
Trade	34.4	35.3	38.3	37.9	36.5	39.0	38.5	37.7	37.4
Transportation and Warehousing	10.6	11.1	11.8	10.4	12.3	12.0	11.2	11.6	9.9
Finance, Insurance, Real Estate, & Leasing	7.8	7.4	7.7	7.4	7.9	8.1	7.6	6.5	6.8
Professional, Scientific, & Technical Services	6.0	6.6	6.8	7.7	7.4	6.7	7.1	6.7	7.5
Management, Administrative and Other	4.1	4.8	5.9	8.4	7.7	7.2	7.4	8.5	7.3
Educational Services	16.4	16.0	16.7	17.3	15.8	16.7	16.8	16.6	21.2
Health Care & Social Assistance	28.3	28.1	28.7	29.3	31.3	29.7	29.4	30.1	30.6
Information, Culture, & Recreation	5.6	6.9	7.4	7.4	7.6	7.9	7.2	8.8	7.5
Accommodation & Food Services	11.5	12.4	11.8	11.9	13.6	12.9	13.5	13.4	12.3
Other Services	12.1	10.9	9.4	10.7	12.7	10.9	11.5	11.3	9.2
Public Administration	17.4	15.6	15.6	16.2	17.1	15.4	14.7	15.3	16.6

 Table 4.12
 Employment by Industry (NAICS), Newfoundland and Labrador,

Source:

Statistics Canada, Labour Force Survey, March 2007

	Province	Clarenville- Bonavista	Burin Peninsula	Avalon Peninsula
Management Occupations		-	-	-
Males	9.2%	7.2%	6.7%	11.1%
Females	6.4%	7.2%	5.3%	6.5%
Business, Finance, Admin.	•		•	•
Males	6.5%	3.2%	2.3%	8.7%
Females	21.4%	14.4%	15.0%	26.3%
Natural and Applied Science & Related	•		•	•
Males	7.6%	4.9%	4.2%	9.7%
Females	1.9%	1.0%	1.2%	2.6%
Health				
Males	2.3%	1.7%	0.9%	3.0%
Females	9.5%	5.6%	7.0%	10.9%
Social Science, Education, Government Se	rvice & Religion			
Males	5.5%	4.3%	4.5%	6.4%
Females	9.6%	8.2%	7.9%	10.4%
Art, Culture & Recreation				
Males	1.5%	0.8%	0.6%	2.3%
Females	2.4%	1.2%	0.4%	3.1%
Sales and Service				
Males	16.0%	10.4%	12.0%	18.8%
Females	34.3%	36.0%	34.4%	30.8%
Trades, Transport, Equipment Operators				
Males	29.4%	36.5%	30.9%	25.8%
Females	1.8%	2.6%	1.9%	1.2%
Primary Industries				
Males	11.6%	15.5%	20.0%	6.3%
Females	2.9%	6.5%	7.5%	1.2%
Processing, Manufacturing and Utilities				
Males	6.9%	13.0%	14.9%	4.8%
Females	5.5%	12.1%	12.8%	3.3%
Other		-		
Males	3.3%	2.4%	2.9%	3.1%
Females	4.4%	5.3%	6.7%	3.6%

Table 4.13Distribution of Workers by Occupation, 2001

Source:

Community Profiles, 2001, Statistics Canada

Trades, transport and equipment and processing, manufacturing and utilities show a higher proportion of employment in the employment catchment regions than do other industries, demonstrating the relationship between industrial activity and number of skilled workers in this region.

Table 4.14 shows the number of individuals reporting to work within the Study Area both fulland part-time. It is not unexpected that the greatest source of employment for men is within the trades, transport and equipment operator jobs as well as in the processing, manufacturing and utilities.

	Sunnyside	Arnold's Cove	Clarenville	Marystown	Southern Harbour	Come By Chance	Placentia
Management Occ	oupations	-	-			-	
Males	0	15	180	145	10	10	20
Females	0	15	185	70	0	0	25
Business, Finance	e, Admin						
Males	0	0	105	40	0	0	201
Females	20	35	235	210	0	15	65
Natural and Applied Science & Related							
Males	15	10	150	45	10	0	45
Females	0	0	30	20	0	0	15
Health			•				
Males	0	0	75	1095	0	0	0
Females	0	0	120		0	0	95
Social Science, E	ducation, Gove	rnment Servi	ce & Religion				
Males	10	0	120	100	0	0	65
Females	0	15	210	185	0	0	70
Art, Culture & Ree	creation						
Males	0	0	15	20	0	0	0
Females	0	10	15	15	0	0	10
Sales and Service	9						
Males	15	10	200	320	10	0	190
Females	35	45	400	470	20	20	370
Trades, Transpor	t, Equipment O	perators					
Males	25	85	390	530	40	45	480
Females	0	0	10	15	10	0	25
Primary Industries	S						-
Males	25	40	20	95	65	10	155
Females	10	15	25	20	30	0	35
Processing, Manu	ufacturing and L	Jtilities					
Males	40	115	105	170	15	15	30
Females	10	105	30	120	35	20	20

Table 4.14	Individuals Reporting Work in Industry, Full-Time and Part-Time, 200	0
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Notes:

Swift Current includes Garden Cove

Southern Harbour includes Little Harbour East

Placentia Includes Dunville, Freshwater and Jerseyside

Source: Community Profiles, Statistics Canada, 2001 Census

#### Labour Force Wages and Income

As demonstrated in Tables 4.15 and 4.16, income levels in the province have seen steady increases; however, income levels in the province are low, relative to Canadian averages, and this is particularly true of rural areas where income levels are generally lower because of the type employment.
Income	1997	1998	1999	2000	2001	2002	2003	2004	2005
Personal Income (\$ millions)	9,963	10,239	10,651	11,122	11,576	11,927	12,447	12,835	13,316
Personal Income per capita (\$)	18,082	18,961	19,983	21,064	22,176	22,981	24,029	24,826	25,907
Personal Disposable Income (\$ millions)	7,949	8,097	8,378	8,740	9,116	9,381	9,788	10,042	10,372
Personal Disposable Income per capita (\$)	14,426	14,994	15,719	16,553	17,464	18,075	18,896	19,424	20,179
Personal savings rate (%)	5.2	4.1	1.9	0.6	1.2	-0.1	-0.7	-1.2	-2.0

 Table 4.15
 Personal and Disposable Income (\$), Newfoundland and Labrador

#### Source:

Statistics Canada, Provincial Economic Accounts, Catalogue No. 13-213, November 2006

	Province	Clarenville-	Burin	Avalon
		Bullavisla	Fellilisula	Fellinsula
Avg. Employment Income (Nominal), 2004				
Total	\$ 26,503	\$ 22,278	\$ 23,307	\$ 30,183
Males	\$ 31,775	\$ 27,693	\$ 29,291	\$ 35,917
Females	\$ 20,579	\$ 15,805	\$ 16,047	\$ 24,079
Average Weekly Earnings, Dec 2006	\$709.76	-	-	-
Percent of Firms Providing Non-Wage Benefits, 2004				
Medical	64.2%	-	-	-
Dental	39.8%	-	-	-
Life/Disability Insurance	35.3%	-	-	-
Pension Plan	14.5%	-	-	-
RRSP	13.9%	-	-	-
Proportion of Total Provincial El Beneficiaries in Population, 2005	-	28.1%	29.1%	13.5%
Proportion of Income Support Recipients in Population, 2005	-	11.3%	12.5%	11.2%

Table 4.16	Income Levels

Source:

Department of Human Resources, Labour and Employment, 2007

Differences in incomes among the communities often reflect the availability and seasonal nature of work in the area, as well as the type of the work available. In Sunnyside, for instance, the local refinery provides steady employment and relatively high wages; this translates into steady indirect employment and wage benefits. On the Avalon Peninsula, labour demand is higher – as is the standard of living. This puts upward pressure on wages, resulting in higher overall incomes. The reliance on transfer payments is directly proportionate to the economic health and independence of an area; income transfers tend to be higher in areas where employment levels and wage rates are relatively low.

Table 4.17 provides community specific income data for 2001 with the majority falling below the provincial average of \$22,176.

Some of the lowest incomes were in the Clarenville-Bonavista region and the highest incomes were realized in the Avalon Peninsula. Incomes in the Burin region were also below the provincial average.

It is difficult to draw any conclusions from community incomes except that the closer to a large development, the more likely the community income will be higher (e.g., Sunnyside, Come By Chance) or if the community is in a growth mode, the incomes are likely to be higher (e.g., Clarenville).

	Sunnyside	Arnold's Cove	Swift Current	North Harbour	Clarenville	Marystown	Southern Harbour	Come By Chance	Placentia	Little Harbour East
Personal Income per capita, 2004,\$	22,700	21,500	23,000	19,900	22,000	20,600	19,200	20,900	17,000	19,000
Average Couple Income, 2004,\$	66,500	64,700	65,000	42,700	52,200	57,500	68,800	51,800	55,800	43,300
Median 2004 Incomes, All, \$	42,800	42,400	43,800	34,400	28,400	40,300	42,100	44,000	NA	15,600
Employment Insurance Incidence, 2001, %	48.2	62.3	40.7	50.0	31.1	34.7	71.4	43.5	45.6	-
Social Assist. Incidence, 2001, %	10.4	4.1	6.1	4.8	10.3	17.6	3.1	6.4	14.1	-

#### Table 4.17Community Incomes

#### Notes:

No income "Income by Source" data available for Garden Cove

Source:

Community Accounts, Income Accounts, Government of Newfoundland and Labrador (2004)

Statistics Canada, Community profiles, 2001

# 4.1.3 Businesses in the Region

Almost 60 percent of the province's businesses are located in the St. John's area, with the others dispersed proportionately throughout other regions of the province. The percentages for the regions nearest to the proposed refinery area are shown in Table 4.18.

There is no data that accurately provides the number of businesses in each sector within the communities of the Study Area; however, 2004 data shows that approximately 6.0 percent of businesses in the Province were located in the Clarenville-Bonavista regions, 3.6 percent in the Burin Peninsula and more than 48 percent on the Avalon Peninsula (Socio-economic Component Study, 2007).

Significant industrial infrastructure exists in the upper portion of Placentia Bay as well as in nearby Trinity Bay (e.g. Newfoundland Transshipment Terminal, North Atlantic Oil Refinery, Kiewit Offshore Services, Marystown, as well as the industrial cluster at Argentia) Much of this infrastructure has been developed to support the development of the Province's oil and gas sector, and significant and ongoing upgrades have ensured that these facilities remain competitive with international standards. Together, these facilities have supported an extensive range of complex industrial projects that have developed comprehensive industrial construction and fabrication capabilities. The relatively close proximity of these facilities provides a competitive advantage to the Province that is not always recognised and offers significant synergies to support continued industrial expansion. (For further details on each of these major industrial sites, refer to Appendix B, Section B-2 in the Socio-economic component Study, 2007.)

Several large non-oil related businesses are located with the Study Area including Smith's Snack Service in Norman's Cove, Icewater Seafoods in Arnold's Cove, Parson's Trucking in Southern Harbour and the industrial park at Argentia (Appendix B, Section B-3 in the Socio-economic Component Study).

The major operations (North Atlantic Refinery, Newfoundland Transshipment Ltd, Kiewit and Sons Co., Bull Arm Site Corporation) are themselves an important part of the business community and create opportunities for other business entities. The commercial fishery in Placentia Bay is also an important contributor to the business community, requiring a range of services from fuel and gear to providing the basis for processing companies' operations in a number of communities. The fishing industry, including both harvesting enterprises and processing, is the largest employer in the Bay (FFAW, 2007).

	Province	Clarenville- Bonavista	Burin Peninsula	Avalon Peninsula
# of Businesses, 2005	16,812	1,018	598	8,119
% of Business in Province, 2004 (%)	100	6.1	3.6	48.3
% of Business with Less Than 5 Employees	10,015	687	421	4,542
Distribution of Total Provincial Firms by Region, 2004 (%)		6.0%	3.6	47.8

#### Table 4.18Businesses in the Region

#### Notes:

The data for new business start-ups and business bankruptcies were not available.

Table 4.19 shows the number of businesses operating in the Clarenville-Bonavista Region, the Burin Peninsula and the Avalon Peninsula.

Table 4.19	Number of Businesses by Industrial Classification (NAICS) in Region,
	December 2005

	Province	Clarenville- Bonavista	Burin Peninsula	Avalon Peninsula
Mining and Oil and Gas Extraction	72	-	-	43
Construction	1,847	144	43	1,046
Manufacturing	629	49	13	304
Wholesale	773	35	14	457
Transportation and Warehousing	824	65	27	324
Professional, Scientific and Technical Services	895	27	18	638
Management of Companies and Enterprises	108	-	-	76
Administrative Support, Waste Management and Remediation Services	611	29	14	350
Accommodation and Food Services	1,427	98	50	605

# 4.2 Project Effects

#### 4.2.1 Impact on Labour Market

#### Background

The project will generate significant employment: 3,000 jobs during construction and 750 during operations. The labour market in the region has experienced temporary and long-term out-migration and this has reduced the size of the labour force, notably among skilled trades people. This could challenge the Project to secure qualified labour among skilled trades and other professional occupations on a timely basis; however, in a survey undertaken for the

Refinery assessment, unions indicated their confidence that much of the labour force that has left the province in recent years to secure employment elsewhere will return (Appendix B). If this does not happen, the Project faces the challenge of trying to attract workers from elsewhere in a very competitive market. It is well understood that the ability to attract NL residents back to the province is far easier than trying to attract individuals from elsewhere. Rural-based employers may also find that they have to overcome a growing reluctance by workers to return or relocate to rural Newfoundland for work, especially if that work cannot be sustained for the longer term.

It is anticipated that approximately 1,500 of the 3,000 workforce required in the construction phase will come from the Employment Catchment Area; the remainder will come from the rest of the province. Of the 750 operations workforce, approximately 50 percent or 375 people will most likely come from the construction workforce. It is anticipated that these people would most likely be from the Employment Catchment Area. Non–union workers within the Employment Catchment Area can be employed but will have to pay union dues; they are likely to be hired for site preparation level work. Hiring will be conducted through union halls.

Tables 4.20 and 4.21 provide estimates of the labour requirements for the construction phase of the project using national Occupational Classification (NOC) code.

Occupation/Skills	NOC	Total Estimated
Process Engineers	2134	20
Mechanical Engineer	2132	40
Civil/Structural Engineers	2231	20
Controls Systems & Instrumentation Engineer	2133	30
Electrical Engineer	2133	20
Metallurgist	2142	5
Loss preventive/Safety Engineer	2141	4
Designer (Drawing Office)	2252	50
CAD Operator	2253	60
Buyer (Procurement)	113	20
Expeditor (Procurement)	1473	10
Document Controller	1413	15
Secretary	1241	10
Engineering Management	211	15
Engineering Technologist	2232	20
HSEQ	2263	20
Project Management	711	10
Project Controls	2131	20
Administration	1221	30
Total		419

 Table 4.20
 Occupational/Labour Requirements (Construction)

Source:

Project Registration Document, NL. Refinery Project. October 16, 2006

Occupation/Skills	NOC	Total Estimated
Pipefitter	7252	690
Millwright	7311	280
Construction Management	711	280
Labourer	7611	270
Electrician	7242	240
Equipment Operator	7421	230
Pipe Welder	7265	200
Insulator	7293	200
Painter	9496	140
Boiler maker	7262	100
Carpenter	7271	90
Ironworker	7264	90
Sheetmetal Worker	7261	90
Welder-Structural	7265	70
Concrete Finisher	7282	30
Total		3,000

 Table 4.21
 Skilled Labour/Trade Requirements (Construction)

Source:

Project Registration Document, NL Refinery Project. October 16, 2006

Table 4.22 provides a breakdown of the occupations, the National Occupational Classification (NOC) code and numbers that are anticipated for each during the operations phase of the project.

•			
Occupation		NOC	# of
		Code	People
Management	Plant Manager	9212	1
	Maintenance Manager	0721	1
	HEALTH, SAFETY & ENVIRONMENT Manager	2263	1
	Corporate Services Manager	0016	1
	Planning and Technical Services Manager	2233	1
	Marketing Manager	0611	1
	Commercial Manager	0711	1
Maintenance	Reliability-Field Services	2243	200
	Inspection	2262	25
	Warehouse	1471	38
	Turnaround (Pipefitters and Welders)	7252	35
		7265	
Production	Chief Steam Engineer	9212	1
	Area Managers	0016	20
	DCS	7242	5
	Training	9232	7
	Process Operators	9232	200
HEALTH, SAFETY & ENVIRONMENT	Environment	2263	8

Table 4.22Breakdown of Occupations (Operations)

Occupation		NOC Code	# of People
	Safety, Fire Protection and Security	2263	20
	Industrial Hygiene	2211	4
Corporate Services	Accounting	1431	24
	Human Resources	0112	6
	Information Technology	2171	9
	Purchasing	0113	10
Planning and technical Services	Operations Scheduling	9212	6
	Long-Term planning	9212	4
	Operations Support Engineering	9212	4
		9212	50
	Laboratory	2211	40
	Marine	2232	30
Total			750

Source:

Project Registration Document, NL. Refinery Project. October 16, 2006 Note:

These estimates do not include outsourced/contracted services or construction personal for turnaround, which is estimated to range from 300 - 750 depending on activities at the refinery.

# **Project Effects**

Table 4.23 indicates the incidence of skilled trades province-wide.

	Members Registered And Residing In Province		How Many Members Are Known To Be Unemployed?		How Many Persons Are Currently Engaged In Apprenticeship Programs?	
	Male	Female	Male	Female	Male	Female
Pipe fitter	650 220 Appre	entices	-	-	-	-
Millwright	360	1	357	-	120; 26 pre-empl	oyment
Labourer	740	60	690	60	N/A	N/A
Electrician	800	8	730	8	250	7
Equipment Operator	120	12	70	12	0	0
Operating Engineers	1000	100	800	94	180	20
Pipe Welder	280		-	-	12	0
Insulator	162	3	99	1	-	-
Painter	107	1	68	2	3	0
Boilermaker	480	06	95	100	12	0
Carpenter	1,253	17	1,223	9	302	
Ironmaker	205	5	190	10	13	2
Sheetmetal Worker	94	1	80	1	16	1
Welder-Structural	195	10	-	-	0	0
Concrete Finisher	272	19	222	19	15	1

#### Table 4.23 Incidence of Skilled Trades Province-Wide

Source: AMEC Survey of Respective Unions, 2007

Table 4.24 reconciles the demand for skilled labour relative during the construction phase of the project relative to the estimated provincial supply. The demand numbers are based on Table 4.21 and the supply numbers on Table 4.23, which are based on data from the unions as provided in a survey for this project (Appendix B). The sourcing of labour for the skilled trades will not draw exclusively from the labour pool in the province; it will also draw on tradespeople from outside the province consistent with normal protocols for unionized trades and unionized work environments.

	Availability*	Project Demand**
Pipe Fitter	870	690
Millwright	361	280
Labourer	800	270
Electrician	808	240
Equipment Operator	132	230
Operating Engineers	1,100	-
Pipe Welder	280	200
Insulator	165	200
Painter	108	140
Boilermaker	486	100
Carpenter	1,270	90
Ironmaker	210	90
Sheetmetal Worker	95	90
Welder-Structural	205	70
Concrete Finisher	291	30
Total	7,181	2,720

Table 4.24	Reconciling the Project Demand for Skilled Labour Relative to Provincial Supply
	(Construction)

Notes:

\*Based on Union Survey – Appendix B

\*\*Project Registration Document, Oct. 16, 2006

Based on the comparisons in Table 4.24, three occupations indicate occupational shortages based on the demand and supply. In the case of "Equipment Operators", "Insulators" and "Painters", demand exceeds supply. As well, in some cases a thin margin exists between the level of demand and the availability of workers, notably "Pipefitters", "Millwrights", "Pipe Welders", "Insulators" and "Sheetmetal Workers". This information will need to be analyzed further by NLRC and the unions.

Data indicates that a high percentage of the union's membership are unemployed and so available to work on the project. Union leaders are very optimistic that the vast majority of skilled tradespeople and labourers who have left the province will return as soon as work becomes available, assuming that wages and benefits are competitive. Most unions believe they will able to meet the demand for labour when the Project proceeds; the majority of respondents did not anticipate that demands from other projects in the area and/or province would interfere with NLRC securing province-based labour for this project. It should be noted

that the welders' and ironmakers' representatives indicated that they did anticipate a shortage from competing projects; concrete finishers believe that there may be some occupational gaps in addressing Project needs. Lead times required by unions to ensure the workforce is available vary from one day to eight weeks. The results of the full survey are provided in Appendix B.

Several other labour force and employment activity effects may also occur. One of the major concerns of Study Area and Employment Catchment Area residents is that union workers will be employed from all around the province (and possibly from outside the province) over unemployed workers within the Employment Catchment Area; this is borne out of experience during Hibernia construction at the Bull Arm Site. As well, a substantial number of workers may not want to return to the area because of the short-term nature of the construction activity, as opposed to the longer-term activity promised in work places such as the Alberta oil sands projects. Another effect is that skilled labour, particularly within municipalities and at local industries, could leave their positions to work at higher paying Project-related employment, thereby depriving these smaller operations of their skilled workforce.

Table 4.25 reconciles the demand for specific occupations as well as skilled labour during the operations phase of the project, relative to the estimated provincial supply. The demand data are based on Table 4-24 above. Supply data for most of these occupations were not readily available; however, in those occupations where demand is relatively low (less than 10), it is reasonable to assume that the required labour will be available. The availability of skilled trades workers is based on the same availability data supplied by unions and assumes that some skilled tradespeople who work on the construction phase will carry over into operations. Generally, it is believed that the demand for skilled trades workers can be fully met from labour within the province.

It is also believed that a high percentage of the labour required for the operations stage of the Project may be filled by workers within the province. People who accept these positions from outside the province, should the expertise not be available provincially, will likely choose to reside in the province.

Once the construction phase concludes, there will be a reduction in the need for many of the skilled trades workers, resulting in negative effects for the local and provincial labour force. Based on other industrial development plans and the timing of the Project, displaced labour may find employment elsewhere in the province on other projects; if not, the reduced demand for labour could trigger renewed out-migration from the Study Area.

Occupation		Availability*	Project
			Demand**
Management	Plant Manager	1	1
	Maintenance Manager	1	1
	Health, Safety and Environment Manager	1	1
	Corporate Services Manager	1	1
	Planning and Technical Services Manager	1	1
	Marketing Manager	1	1
	Commercial Manager	1	1
Maintenance	Reliability—Field Services	Unknown	200
	Inspection	Unknown	25
	Warehouse	38	38
	Turnaround (Pipefitters and Welders)	1,000+	35
Production	Chief Steam Engineer	1	1
	Area Managers	Unknown	20
	DCS	Unknown	5
	Training	7	7
	Process Operators	Unknown	200
Health, Safety and Environment	Environment	8	8
	Safety, Fire Protection and Security	Unknown	20
	Industrial Hygiene	4	4
Corporate Services	Accounting	Unknown	24
	Human Resources	6	6
	Information Technology	9	9
	Purchasing	10	10
Planning and technical Services	Operations Scheduling	6	6
	Long-term Planning	4	4
	Operations Support Engineering	4	4
	Technical Services and Projects	Unknown	50
	Laboratory	Unknown	40
	Marine	Unknown	30
Total			750

# Table 4.25Reconciling the Project Demand for Skilled Labour Relative to the Supply for the<br/>Operations Phase

Notes:

\*Based on Union Survey for tradespeople and estimates where demand for positions are less than 10. \*\*Project Registration Document, Oct. 16, 2006

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# 4.2.2 Impact on Local Businesses

The Project provides a significant opportunity for local businesses in the Study Area at a time when parts of the region's economy struggles with a decline in traditional industries and the slowdown of some larger scale operations such as the Bull Arm fabrication-site, the Marystown

and Cow Head facilities and fish processing. These slowdowns are negatively impacting businesses that rely on these industrial operations for the supply of goods and services. As well, the out-migration triggered by the economic slowdown has further compromised the stability of local businesses that provide goods and services. The Project will provide economic stability and growth to the businesses and local communities and help to reverse the current economic environment.

The Project has already substantially contributed to the economy through the development of a feasibility study and the preparation of the Environmental Impact Statement. Many of these and other initiatives have been contracted to companies in the Study Area and the Employment Catchment Area, and the province as a whole. Other opportunities will be developed for local businesses as NLRC contracts for the provision of goods and services.

# **Project Effects**

The construction and operation of the refinery will help the Study Area and the province as a whole to increase its capacity and reputation for the development of large-scale energy related projects. This will result in heightened activity within Placentia Bay and eastern Newfoundland. There will also be opportunities to use some existing facilities to support construction of the refinery and ongoing operations. For example, housing facilities at Bull Arm and the fabrication facilities at Marystown, Cow Head and other provincial yards will be able to support project requirements. Pre-construction work will provide meaningful business opportunities for firms engaged in feasibility assessment, environmental assessment, engineering and site preparation work. The construction and operations phases will provide direct and indirect increased sales for a wide variety of businesses. Many local businesses have experience in responding to the needs of large-scale projects; a significant benefit of this is their good understanding of the types of goods and services required for such projects as well as issues that will affect their competitiveness.

Local businesses have demonstrated that they are anxious to realize increased business opportunities associated with the Project. Direct opportunities through the provision of goods and services include:

- Office supply agencies and support services
- Commercial printing services
- Courier services
- Heavy equipment rental services
- Auto rental, sales and repair services
- Environmental monitoring
- Bed and breakfasts
- Excavation services

- Snow clearing services
- Wholesale trade
- Commercial food services and catering
- Commercial cleaning services
- Transportation services
- Construction services
- Engineering services
- Customs clearance
- Pilot tugs and other services
- Computer sales and service
- Industrial product sourcing services
- Legal services

The influx of workers and the associated increase in population resulting from the project will provide businesses that provide goods and services to the local population with a significant boost therein, potentially enabling some to expand their operations and increase their overall capacity. Businesses that will be most likely to experience indirect business opportunities include, among others:

- Accommodation services and real estate
- Auto sales and services
- Retailers
- Personal services providers
- Entertainment industries
- Personal finances and other like services
- Dry-cleaning
- Health care goods and service providers (eg., Chiropractic services)
- Restaurants and beverage providers
- Bakeries
- Household and commercial cleaning services
- Child daycare providers

The Project will also support new business opportunities not always associated with large-scale construction projects. As an example, it will create tourism-related opportunities similar to those generated by other large industrial projects such as Hibernia, as people are interested in observing the construction of large-scale projects and key project milestones. This, in turn, will provide a boost, albeit small, to local tourism-related businesses such as accommodations and food and beverage providers in the Study Area.

In addition, employment opportunities at the refinery, and at businesses supplying goods and services to the Refinery and its employees, will lead to an increased capacity of the Study Area, including the Avalon region. The increase in business will help to diversify the provincial economy by strengthening other industries, resulting in a more sustainable economy as businesses that grow to meet the demands of the two refineries in Placentia Bay are able to provide services to other firms and industries in related fields

# 4.3 Mitigation Measures

# 4.3.1 Labour Market Mitigation Measures

Specific labour market mitigation measures will include the development of a labour market and a human resources strategy that addresses labour force availability, skilled trades recruitment, diversity in recruitment, training, wages and benefits.

NLRC will undertake specific mitigation measures to manage labour force supply and demand. It will:

Labour force availability:

- Work with unions, post-secondary institutions and high schools to make information available for skills where a potential shortage exists;
- Develop strategies to encourage older workers to remain in the workforce beyond early retirement years;
- Develop an employment profile and strategy that addresses the need for all ages to be represented in the workforce for succession planning purposes; and
- Adhere to the Collective Labour Agreements

# Recruitment:

- Demonstrate to young people the value and longevity of a career in skilled trades by continuing to hold career sessions at local high schools;
- Recruit younger workers to return to stay in the Province independently and as part of other initiatives;
- Provide Department of Human Resources, Labour and Employment (HRLE) with ongoing and regularly updated employment information for its data banks;
- Provide economic development and sector agencies (e.g., Newfoundland and Labrador Environmental Industry Association (NEIA), Newfoundland Ocean Industries Association (NOIA)), and government (e.g., Rural Secretariat, HRE, NL Skills Task Force) and Project Website staffing requirements according to construction and operation schedule;
- Publicize that the Project is a union site during the construction phase and stress the importance to young people of obtaining trades qualifications in order to be hired (see also Training);

- Publicize that the Project will actively support a faster rate of apprenticeship training and certification by ensuring an increased ratio of apprenticeships to journeymen (see also Training);
- Emphasize the importance of hiring locally and work with unions to optimize local recruitment;
- Publicize that local non-certified union employees will be hired in the early phases of construction;
- Continue and enhance ongoing "Resumé Bank" initiative
- Work with local agencies and groups to help them better understand and thus educate others about what a union job site means and how to become employed at such a job site;
- Plan the transition of local workers into the operations phase once construction begins; and
- Provide employment curve information by year and skill demand and ensure that it is well-communicated throughout the province at appropriate institutions, organizations and agencies.

Recruitment and Retention of a Diverse Workforce:

- Develop and implement a human resources strategy for recruitment, retention and promotion that will contribute to the creation of a diversified workforce;
- Communicate to the public that the project is an equal opportunity employer and encourage a workforce that is fully diversified;
- Ensure opportunities for a representative number of a diverse workforce to transition from the construction to the operations phase and ensure that this transition is well planned; and
- Establish a "family friendly" work environment
- Continue ongoing employment information dissemination program to all Study Area and Employment Catchment Area communities and have a special emphasis on creating a diversified workforce;
- Target higher participation among women and other under-represented groups among skilled trades by:
  - Providing project skills, educational requirements and financial support to organizations such as WISE, Women in Resource Development, the Ability Employment Corporation, the Hub and the Community Access program; and
  - Providing ongoing project public awareness activities, particularly at high schools within the Study Area and Employment Catchment communities and postsecondary education institutions within the Employment Catchment Area.
- Continue using the Project Information Centre at the entrance to the Bull Arm Construction and Fabrication site for project, recruitment and employment information.

Wages and Benefits:

- Ensure every effort is made to publicly communicate:
  - Its corporate culture;
  - o Commitment to health, safety, environment and social responsibilities;
  - o Commitment to creating and maintaining a family friendly workplace; and
  - o Commitment to enhancing the quality of life in the Study Area;
- Offer competitive wages and benefits and a positive work environment:
- Ensure that wage rates and benefits are sufficient to encourage workers to relocate and to mitigate against a possible increased cost of living (e.g., increased housing costs in Study Area as a result of the Project);
- Plan strategies and publicize them for sustained employment, both direct and indirect;
- Establishing work strategies to support and promote women and other underrepresented workers in the workplace;
- Help underemployed individuals move to positions at their level to open up other positions for the right level;
- Work with appropriate agencies to ensure sufficient capacity exists within communities for new demands on housing and other services/supports; and
- Provide support to local communities to fund initiatives focused on entrepreneurship (e.g., Lending Circles), sustainability and socio-economic development to help offset the potential of increased income disparity among households as a result of substantial wage increases within the region.

# 4.3.2 Mitigation Measures Targeted at Local Businesses

The Project's commitment to purchase goods and services within the Study Area and the province as a whole will continue to help position Placentia Bay as the industrial area of the province, and will contribute to the energy sector, fuelling economic diversification within the province and recognition within the area as a petroleum industrial cluster. By maximizing the local sourcing of goods and services the Project will have a valued impact on stabilizing existing businesses adversely impacted by the current economic downturn. The Project may also provide opportunities for business expansion and the creation of new specialized services.

Businesses will need to be prepared to respond to business opportunities and may need to make adjustments in their business practices in order to service the project. Specifically, local businesses providing goods and services will have to work within the normal protocols of a unionized environment.

NLRC understands the importance of maximizing the contribution to be made by the refinery to the local economy through its supplier-development initiatives and will undertake specific mitigation measures to enhance local business opportunities including:

- Establishing a comprehensive supplier outreach and development program that introduces mechanisms to educate local businesses on the goods and services that will be required by the Project; outline the criteria that the company will expect suppliers to meet, and provide advice on measures to assist local businesses in meeting the supplier criteria and in being competitive. Mechanisms would include supplier development seminars, print materials and other initiatives.
- Undertaking supplier development initiatives in partnership with local business and economic development groups within the Study Area and the Avalon Peninsula and then provide these groups with the information they need to, in turn, counsel local businesses;
- As part of a supplier outreach program, developing a procurement supplier brochure that will provide a schedule of project phases and the goods and services that will be sourced during the project phases; this brochure could also:
  - Identify those goods and services which are most likely to be sourced locally and therein which businesses will most likely be impacted;
  - Outline to the business community the criteria that the company will use to assess and pre-qualify suppliers;
  - o Outline the process that the company will tendering for goods and services;
  - Provide detailed procurement needs during Front-End Engineering and Design (FEED) engineering and detailed design stage;
  - Implement a standard decision-making process for selection of bids so that businesses can clearly understand why their bid was unsuccessful.
  - Provide timely and honest debriefings to unsuccessful bidders when requested;
  - Ensure the business community understands the protocols that will be required in supplying goods and services to a large unionized project and provide advice on how protocols can be met without compromising their ability to be competitive;
- Delivering a "Reverse Trade Show" or like activity in which businesses can meet the people who will be responsible for procurement and outline what goods and services they can provide;
- Developing a pre-qualification process for local businesses and provide assistance to local business in responding successfully to calls for supplier pre-qualification;
- Providing comprehensive online supplier support, including pre-qualification questionnaires, manageable contract package templates, supplier development materials, a business registry;
- Ensuring a NLRC business development person liaises with business organizations on business policy matters such as bid qualifications, post-bid debriefings and forecasts of future procurement activity;

- Providing regular information and schedules on tender calls that will be released in advance of the tender being called and ensure that pre-qualified bidders receive notification of all tendering opportunities;
- Developing tender packages that are small (if possible) and reflect local capabilities (e.g., workforce, facilities, working capital requirements, and availability of equipment) so as to increase the chances of local success in bidding;
- Providing direct support to assist business in developing their capacity to supply goods and services to the project including:
  - direct support through seed investment or other means to facilitate investment in business development;
  - help in establishing "lending circles" or similar concepts to help start up small businesses in the region;
- Undertaking site visits and work with potential suppliers to respond to proponent's standards and other requirements;
- Using "best efforts" to identify capacity gaps early;
- Ensuring unsuccessful bidders have early access to debriefing opportunities so that they can learn how to increase their opportunities for success; and
- Developing some capacity to support the "industrial tourism" activities associated with the project, including the development of potential lookout sites, project information brochures and a schedule of tours.

# 4.4 Residual Effects

#### 4.4.1 Labour and Employment

The Project will have a significant positive residual effect on labour and employment, particularly in the Study Area and the Employment Catchment Area as well as in the province as a whole. This amount of new employment is significant in a province that has suffered from severe out-migration because of lack of opportunities for skilled employment.

#### Summary Chart

Table 4.26 provides a summary of the residual effects on the labour market.

#### Construction

As a result of the demand for labour, the direction will be positive in that employment will be available for those who are qualified. The magnitude will be high because of the number of people that will be employed. The geographic extent will be regional and provincial assuming that the demand for labour can be filled within the province. The duration is medium-term. The effect on labour is continuous. Reversibility of the effect is not desired and therefore not assessed. The level of confidence in the accuracy of information is high since the number and type of skills is known, as are the skills for which the province currently shows a shortage. The

Labour Market VEC	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Level of Confidence	Certainty	Mitigation or Enhancement Success	Significance
Demand for labour (Construction)	Positive	High	Regional – Provincial	Medium- Term	Continuous	NA	High	High	Highly Effective	Major
Demand for labour (Operations)	Positive	High	Regional	Long- Term	Continuous	NA	High	High	Highly Effective	Major
Social Assistance / EI Recipients (Construction)	Positive	Low-Medium	Regional	Short- Medium Term	Continuous	NA	Low or Medium	Low or Medium	Highly Effective	Minor
Social Assistance / EI Recipients (Operations)	Positive	Low-Medium	Regional	Short- Medium Term	Continuous	NA	Low or Medium	Low or Medium	High	Minor
Disposable income for households (Construction)	Positive	Low-Medium	Regional	Short- Medium Term	Continuous	NA	Medium	Medium	High	Minor or Moderate
Disposable income for households (Operations)	Positive	Low-Medium	Regional	Short- Medium Term	Intermittent	NA	Medium	Medium	High	Minor or Moderate

Table 4.26Labour Market

certainty of employment is high because the project cannot proceed unless it has workers, and the enhancement will be highly effective if labour needs can be met within this province by employing returning Newfoundland and Labrador residents. The effect will be significant if 3,000 residents are employed.

Another positive effect arises with the expected decrease in the number of EI and social assistance recipients with the increase demand for labour of a variety of ranges and skills. This effect is rated as low or medium in magnitude in that it will affect only a few people in each community, regional, short- or medium-term, and continuous. Since the effect is positive, reversibility is not desired and therefore not assessed. A low or medium level of confidence is assigned to this prediction and there is a low or medium probability that the effect will occur. Enhancement success should be highly effective since the demand for workers will be significant and, even if not on a unionized job site, significant opportunities for indirect employment will occur within the Project area (increased demand for food, housing, transportation, etc.) The effect is expected to be of moderate significance.

Increased average disposable income for households will be another positive effect, albeit low or medium magnitude, depending on the individual community, and regional in extent because many of these workers were already employed in well-paying jobs elsewhere. It will most likely affect women who generally did not move away for work, but have an increased opportunity for direct or indirect employment as a result of this project. The effect will be short- or mediumterm, and continuous. Since the effect is positive, reversibility is not desired and therefore not assessed. A medium level of confidence is assigned to this prediction and there is a medium level of probability that the effect will occur. Enhancement will occur if every effort is made by the company, the local community and the government to employ under-employed workers in the Study Area such as women and other groups that contribute to a diverse workforce. The effect is expected to be of minor or moderate significance unless the groups indicated above are employed, in which case it will be significant for these groups.

Increased average disposable income for households could be another positive effect of the Project. It would be of low or medium magnitude, depending on the individual community, and regional in extent because many of these workers were already employed in well paying jobs elsewhere. The effect would be short- or medium-term, intermittent. Since the effect is positive, reversibility is not desired and therefore not assessed. A medium level of confidence is assigned to this prediction and there is a medium level of probability that the effect will occur. Enhancement success will occur if the income of a household is increased by the employment of another household member (e.g., spouse) who was not employed or fully employed before project start-up. The effect is expected to be of minor or moderate significance.

# Operations

As a result of the demand for labour, the direction will be positive in that employment will be available for those who are qualified. The magnitude will be high because of the number of people that will be employed. The geographic extent will be regional, assuming that the demand for labour can be locally filled. The duration is long-term and the effect on labour is continuous. Reversibility of the effect is not desired and therefore not assessed. The level of confidence in the accuracy of information is high since the number and type of skills are known, as are the skills for which the province currently shows a shortage. The certainty of employment is high because the project cannot proceed unless it has workers, and the enhancement will be highly effective if labour needs can be met locally, including using returning Newfoundland and Labrador residents. The effect will be significant if 750 people from the Study Area obtain full-time employment.

Another positive effect arises with the expected decrease in the number of Employment Insurance (EI) and social assistance recipients with the increased demand for labour of a variety of ranges and skills. This effect is rated as low or medium in magnitude in that it will affect only a few people in each community, regional, short- or medium-term, and continuous. Since the effect is positive, reversibility is not desired and therefore not assessed. A low or medium level of confidence is assigned to this prediction and there is a low or medium probability that the effect will occur. Enhancement will occur if every effort is made by the company, the local community and the government to employ underemployed workers in the Study Area such as women and other groups that contribute to a diverse workforce. The effect is expected to be of minor significance unless the groups indicated above are employed, in which case it will be significant for these groups.

Increased average disposable income for households could be another positive effect of the Project. It would be of low or medium magnitude, depending on the individual community, and regional in extent because many of these workers were already employed in well-paying jobs elsewhere. The effect would be short- or medium-term and continuous. Since the effect is positive, reversibility is not desired and therefore not assessed. A medium level of confidence is assigned to this prediction and there is a medium level of probability that the effect will occur. Enhancement success will occur if the income of a household is increased by the employment of another household member (e.g., spouse) that was not employed or fully employed before project start-up. The effect is expected to be of minor or moderate significance.

# 4.4.2 Local Business

The Project will have a significant positive residual effect on opportunities in the Study Area; both those that will service the Project directly and those that will benefit indirectly from increased businesses associated with local population and household income increases. The significance of the Project is based on the expectation that it will provide increased economic

security within the local economy at a time when it has been challenged. The degree of positive effects during the construction phase will depend on the ability of local businesses to competitively provide goods and services to the Project, and the success with such efforts will be somewhat dependent on the success of supplier development initiatives. During the operations phase the direct effects associated with increased employment and incomes will be significant to the local economy. Overall, the positive effects of the Project on local businesses are expected to be medium to high for the area and the province. A high level of confidence is assigned to this prediction and there is a high probability that the effect will occur.

# Summary Chart

Table 4.27 provides a summary of the residual effects on local businesses.

# Construction

The increase in opportunities experienced by local business in the project area will have a positive impact of low to medium magnitude, depending on the capabilities within individual communities as well as on a regional and provincial basis. The effect will depend on the nature of the work being contracted and the ability of local firms to respond to the tender requirements. Effects could be short-term to long-term, intermittent or continuous depending on the nature of the goods or services being sourced and whether they are required on a one-time basis or ongoing. The effects are reversible and again based on the nature of the goods or services being sourced. A high level of confidence is assigned to this prediction and there is a high level of probability that the effect will occur.

There are significant opportunities to enhance project effects on local businesses, notably through the supplier development initiatives described previously. By successfully working with local suppliers, developing their capabilities, designing tender calls that reflect local capability and facilitate local participation, effects could increase and be longer lasting. Depending on the extent of the supplier development initiative and other factors, effects will be moderate to significant.

The opportunity for businesses to expand and diversify their operations and potentially increase their capability to source work outside of their traditional trading area would also provide long-term positive impacts supporting increased economic diversification and sustainable economic development. This effect is rated as being of medium magnitude, continuous and reversible, depending on overall provincial growth and/or the ability to pursue export markets. A low to medium level of confidence is assigned to this prediction and there is a low probability that the effect will occur. The effect is expected to be significant.

Local Business VEC	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Level of Confidence	Certainty	Mitigation Or Enhancement Success	Significance
Local Business Opportunities (Construction)	Positive	Low-Medium	Regional- Provincial	Short-Term to Long- Term	Intermittent or Continuous	Yes	High	High	High	Minor or Moderate
Local Business Opportunities (Operations)	Positive	Low-Medium	Regional- Provincial	Short-Term to Long- Term	Continuous	Yes	Medium	Low- Medium	NA	Minor or Moderate
Business Expansion (Construction)	Positive	Medium	Regional- Provincial	Long-Term	Continuous	Yes	Low- Medium	Low	NA	Minor
Business Expansion (Operations)	Positive	Medium	Regional- Provincial	Long-Term	Continuous	Yes	Medium	Medium	NA	Minor- Moderate
Industrial Tourism/Spin Offs (Construction)	Positive	Low	Local	Short-Term	Intermittent	Yes	Low- Medium	Low- Medium	NA	Minor
Industrial Tourism/Spin Offs (Operations)	Negative	Low	Local	Short-Term	Intermittent	Yes	Low- Medium	Medium	NA	Minor

Table 4.27Local Business

Opportunities for "industrial tourism" would provide positive impacts for local service providers dependent on the tourism trade. The effects will be dependent on the efforts to promote this business opportunity and are expected to be of low to medium magnitude in that there may be limited associated tourists and the length of visits could be as short as one day. Effects will be local, short- term and intermittent based on the construction schedule. Effects are reversible. A low to medium level of confidence is assigned to this prediction and there is a low to medium probability that the effect will occur. The overall effect is expected to be of minor to moderate significance.

# Operations

During the operations the procurement of goods and services will change and become somewhat more predictable and stabilized. The extent of direct procurement from local businesses is difficult to predict but is expected to continue providing steady and consistent business in some areas. Opportunities for businesses during this period will depend to some extent on the success of supplier development initiatives in the construction phase, the relationships that have been developed with the Project and how local businesses have developed their operations to respond to project requirements. Overall the continuing effect for businesses in the Project area is expected to be positive and low to medium in its magnitude and continuous. The effect is reversible and will occur when the Project has been concluded. A medium level of confidence is assigned to this prediction and there is a low to medium probability that the effect will occur.

Local businesses that do not rely on the Project for direct sales and service but rather on the general population (retailers, personal services, etc.) will experience a decline in related business as the workforce associated with construction activity declines. However, the workforce associated with operations will still be significant and stable, continueing to provide meaningful effects in sustaining local businesses. Overall the continuing effect for businesses realizing indirect effects is expected to be positive and medium in its magnitude. The effect is reversible and will occur when the Project has been concluded. A medium level of confidence is assigned to this prediction and there is a medium probability that the effect will occur. The overall effect is expected to be of minor to moderate significance and sustained throughout the life of the Project.

Spin-off tourism opportunities associated with the Project may decline after it is in operation for a number of years and is no longer a source of fascination. The resulting effect of this is expected to be neutral and of low magnitude. A low to medium level of confidence is assigned to this prediction and there is a medium probability that the effect will occur. The overall effects are expected to be minor for local businesses.

# 4.5 Monitoring and Follow-Up

# 4.5.1 Labour and Employment

As part of NLRC's commitment to socio-economic monitoring, the company will compile statistics on workforce development and employment including on a gender basis.

The Government of Newfoundland and Labrador will also monitor employment statistics through its Department of Human Resources, Labour and Employment.

# 4.5.2 Local Business

As part of NLRC's commitment to socio-economic monitoring, the company will compile data regarding specific supplier development initiatives and the level of participation in these initiatives. It will provide full disclosure of its tendering practices, evaluation criteria and the merits of individual contracts awarded. It will compile statistics on the number, lifespan and value of contracts that have been secured by local businesses annually, as well as contracts that are secured by provincial businesses. The Company will also work with relevant provincial government departments in reporting these numbers and their value to the local, regional and provincial economy. The Company will monitor success of any lending circles or other innovative business investment mechanisms.

# 5.0 COMMERCIAL FISHERIES AND AQUACULTURE

This section describes the commercial fisheries and aquaculture baseline for Placentia Bay and for the area nearest the proposed refinery in particular.

For the purpose of this baseline analysis, the study area is all of Placentia Bay encompassed by North Atlantic Fisheries Organization (NAFO) Unit Area (UA) 3PSc, as shown on the map below (Figure 5.1).



Figure 5.1 Study Area

Discussion of Placentia Bay's commercial fisheries includes a historical overview of those activities, recent changes in the fisheries management regime in the area and a description of key species and harvesting patterns and locations. Current aquaculture operations and sites are also described, including a brief summary of development trends within this sector during the past decade. A final section provides a brief overview of the study area's fish processing sector.

In addition to relevant historical data, the commercial fisheries analysis relies on existing (2003-2006) federal Department of Fisheries and Oceans (DFO) data on study area fisheries resources and catches. Information from these sources was supplemented with information collected directly from the fish harvesters themselves through the FFAW Union. Harvesters identified fishing grounds for several commercial species and also provided information on interactions between fish-harvesting activities and vessel traffic in Placentia Bay.

The overview of past and current aquaculture activities is based on information obtained from the Newfoundland and Labrador Department of Fisheries and Aquaculture (DFA). The report also draws on background information from existing agency reports, other research studies and the consultant's files. The discussion on current aquaculture activities also relies heavily on consultations undertaken with all of the existing licence holders in Placentia Bay, as well as consultations with agency (DFA) managers and other industry participants presently exploring the potential for new aquaculture development opportunities in the area.

# 5.1 Data Sources

The statistical data and analysis in this report are based primarily on time-series data from the DFO, Newfoundland and Labrador Region and Maritimes Region<sup>8</sup> describing the quantity, month and location (fisheries management Unit Area) of fish harvesting. The datasets also include information on fishing gear, vessels and other information. They have been acquired from DFO in digital form, for the period from 1984 to 2006. The analysis for this document presents historical information about the Placentia Bay fisheries and then focuses on the current fisheries environment, i.e., the 2003-2006 period, which includes the most recently-available data.

About 15 percent of the harvest by quantity from UA 3PSc was specifically geo-referenced in 2004, 2 percent in 2005 and 12 percent in 2006. Though this represents quite a small portion of the harvest overall, this section also provides maps of the geo-referenced data that are available to indicate at least a subset of the harvesting locations<sup>9</sup> in Placentia Bay. This

<sup>&</sup>lt;sup>8</sup> A small proportion of the harvest from within UA 3PSc is landed in Maritimes (Nova Scotia) Region (less than 15 tonnes in 2005); these datasets are included within the Newfoundland and Labrador Region data and are used in this analysis.

<sup>&</sup>lt;sup>9</sup> The location given is that recorded in the vessel's fishing log, and is reported in the database by degree and minute of latitude and longitude; thus the position is accurate within approximately 0.5 nautical miles of the reported co-ordinates. It should be noted that for some gear, such as mobile gear towed over an extensive area, or for extended gear, such as longlines which may be several miles long, the reference point does not represent the full distribution of the gear or activity on the water. However, over many data entries, the reported locations create a fairly accurate indication of where such fishing activities occur.

information is supplemented by the information provided in the FFAW survey of (primarily) those fishing from vessels under 35 feet length over all (LOA).

The main analysis of harvesting activities describes fish caught within the waters of fisheries management unit UA 3PSc (see Figure 5.1). This management and data area encompasses all of Placentia Bay, and includes 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. For example, some of the larger (>35 foot) vessels based in the area take a portion of their annual catch on fishing grounds farther offshore, such as St. Pierre Bank, whereas catches by fishers based in other areas of the province, e.g., in Fortune Bay, are included in the analysis if taken within 3PSc.

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, driven primarily by market conditions, which in turn are determined by supply and demand, currency exchange rates and other market factors. Quality issues also affect the prices paid for many species. Consequently, most of the analysis provided in this section involves quantity of harvests (tonnes of fish landed), which is directly comparable from year to year.

Other data sources include fisheries management plans and data tables (e.g., fishing enterprises) provided by DFO. Information on Aquaculture was provided by the DFA, including its AguaGIS.com database, and from individual aquacultural licence holders consulted for this analysis in November 2006 and again in April 2007.

# 5.2 Consultations

Relevant DFO and DFA managers and existing aquaculture licence holders were contacted to obtain current information on the area's fisheries and aquaculture sector activities. Appendix A provides a list of organizations and persons consulted for the purpose of this assessment.

In addition, NLRC held introductory meetings with fishers in communities throughout the Study Area and worked with FFAW Placentia Bay Sub-Committee, following its formation in January 2007. NLRC has also participated regularly in Placentia Bay Traffic Committee meetings and briefed the Placentia Bay Integrated Management Committee on the Project and the assessment work.

# 5.3 Existing Environment

## 5.3.1 Commercial Fisheries

This section presents a detailed review of the commercial fisheries harvesting environment in the Placentia Bay study area. Topics addressed include the historical context, species harvested, monthly distributions of fishing activities, fishing gears used, and geographic location of fishing activities where that information is available.

# Historical Context, 1980s to the Present

Drastic changes occurred in the Placentia Bay commercial fisheries in the early 1990s, when fisheries moratoria were imposed because of declining groundfish stocks. For example, within 3PSc for the period 1984 to 1990, 74 per cent of the catch by quantity was cod while snow crab made up just 3 per cent; during 1994 to1995, immediately after the moratoria were imposed, cod made up only 6 per cent of the harvest and snow crab catches increased to 24 per cent. In terms of value, cod accounted for nearly 60 per cent of the value of the 3PSc harvest (1984 to1992), but only a negligible amount in 1994 to1995 (see Figure 5.2).

Between the landings highpoint in 1986 and the 1995 harvest, the quantity of biomass taken from Placentia Bay declined from more than 19,000 tonnes to under 3,000 tonnes, a drop of 85 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 (\$9,740,000 compared to \$10,634,000). Value continued to rise after 1995, until, by 2002 the harvest from 3PSc was worth more than \$18 million, nearly 180 per cent of the value of the harvest in 1986, the year that the peak quantity was harvested over this timeframe. Even with weaker prices in recent years, snow crab is still a very valuable species in this area.

A limited cod fishery was reinstated in 3PSc in 1997 under a strict management regime, and during 2000 to 2002 cod again accounted for nearly 60 per cent of the harvest by quantity, though in recent years quotas have been reduced once more. The following graphs show the changes in the quantity of the harvest from 3PSc over the last 20 years (1987 to 2006). Figure 5.3 shows the overall quantity harvested (all species), Figure 5.4 shows groundfish harvests (mainly cod), and Figure 5.5 shows all other species (mainly shellfish and herring) over this period.



Figure 5.2 Value of Fisheries, 3PSc



Figure 5.3 3PSc Harvest, All Species, 1987-2006



Figure 5.4 3PSc Harvest, Groundfish, 1987-2006



Figure 5.5 3PSc Harvest, Other Species, 1987- 2006

The notable increase in 2006 for non-groundfish species is owing to greatly increased whelk harvesting recorded in the DFO dataset for that year. However, DFO managers report that relatively few fishers are harvesting whelk directly within Placentia Bay, and were not aware of any catch locations within the study area. They suggest that most of this species catch is made in areas beyond 3PSc, e.g., in the St. Pierre Banks area (M. Eddy, pers comm., April 2007; R. Smith, pers comm., May 2007). However, some 60 records in the 3PSc data locate whelk harvesting in Placentia Bay, and the gear type associated with all the 3PSc whelk records (pot) is correct for this species.

Since the mid-1990s, the fisheries and fisheries management and licencing regimes in Placentia Bay have continued to evolve. Most significantly, a fish harvesting rationalization strategy was implemented in the province to reduce the number of participants in the harvesting sector, and a professionalization process was introduced which prescribed 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.

The following sections provide more information on key aspects of present-day Placentia Bay fisheries.

# Current Harvesting

Data taken from 3PSc landings information for the years 2003 – 2006 show that cod is still by far the most important species harvested in the area. Snow crab, herring and lumpfish (roe fishery) make up most of the remainder of the harvest. A summary of percentage of the catch for the top few species is shown in Table 5.1, the full harvesting information is in Appendix C. Although lobster makes up a small percentage of the harvest, the value is of much greater significance to harvesters.

Species	2003 % of Total	2004 % of Total	2005 % of Total	2006 % of Total
Cod	53.4	57.0	59.1	43.2
Snow crab	24.7	15.4	7.5	5.7
Herring	11.7	11.5	3.3	8.4
Lumpfish	1.4	7.5	4.9	4.1
Scallop	2.0		1.4	5.2

Table 5.1	3PSc Harvest,	2003—2006	<b>Main Species</b>
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In 2006, the Individual Quotas (IQs) for various Placentia Bay-based fishers, by vessel size, was as follows:

- < 25' 14,350 lbs / 6.51 tonnes (round weight)
- 25'- 34'11" 23,000 lbs / 10.43 tonnes (round weight)
- 35'- 65' 38,700 lbs / 17.55 tonnes (round weight)

The overall 2007 3PS snow crab quota is 4,065 tonnes, while the quota for Placentia Bay itself (3PSc, Figure 5.1) is 975 tonnes: 450 tonnes for Inner Placentia Bay, and 525 tonnes for Outer Placentia Bay. The IQs are as follows:

For small boat (< 35') fishers

- in Inner Placentia Bay
   5,040 lbs / 2.29 tonnes
- in Outer Placentia Bay 6,740 lbs / 3.06 tonnes

Placentia Bay-based crab fishers holding Supplementary licences had an overall IQ of about 65,000 pounds but do not fish within 3PSc.

In terms of economic value, the area's commercial fishers usually depend on three high-value species – lobster, snow crab and cod – for the bulk of their annual fishing income.

While lobster accounts for only a small percentage by weight of the annual catch, given its high value this species remains very important to many study area fishers, and tends to be fished quite close to shore. The herring fishery, although important (especially as bait), does not have the direct economic value of the other three fisheries.

Harvest information and recent values for the harvest specifically for ports near the proposed refinery site are provided below.

# Seasonality

Some harvesting is conducted year-round, as it was in the pre-moratorium (1984-1992) period, though in recent years it has been much less evenly distributed throughout the months (see Figure 5.6). Since 1996, the peak harvesting months have been June and July, but there has also been a fairly strong fishery in the late fall (for cod) as indicated in the graph.



Figure 5.6 3PSc Harvest by Month, All Species

The following graphs show the timing of the 2003-2006 harvests for selected Placentia Bay species.







Figure 5.8 3PSc Harvest by Month, Snow Crab


Figure 5.9 3PSc Harvest by Month, Scallops



Figure 5.10 3PSc Harvest by Month, Lobster



Figure 5.11 3PSc Harvest by Month, Whelks

### Harvesting Locations

The following maps show the locations recorded in the DFO georeferenced dataset for all species, 2003-2006, aggregated, and then for selected species (Atlantic cod, snow crab and scallop). As noted above, however, this represents only a small sub-set of the 3PSc harvest. Some species (for example, lobster) are not represented at all in the georeferenced data. The Placentia Bay Traffic lanes (Vessel Traffic Separation Scheme or VTSS) are also shown on these maps.

The maps for cod, snow crab, scallop and lobster fishing grounds, based on information from harvesters, are also presented. This information came primarily from fishers with vessels under 35 feet in length and their information would not be captured by the DFO dataset. The report from FFAW (main text) is provided in Appendix C and additional maps of finishing grounds for other species are included in the Map and Drawings Folio.



 Figure 5.12
 2003-2006 Recorded Fishing Locations, All Months, All Species, Aggregated

 Source DFO



 Figure 5.13
 2003-2006 Recorded Fishing Locations, All Months, Atlantic Cod, Aggregated

 Source DFO







 Figure 5.15
 2003-2006 Recorded Fishing Locations, All Months, Snow Crab, Aggregated

 Source DFO
 Image: Comparison of C







 Figure 5.17
 2003-2006 Recorded Fishing Locations, All Months, Scallops, Aggregated

 Source DFO





### Fishing Gear

In many cases the fishing gear used is specific to the species harvested: pots for snow crab, scallop drags for scallops, diving for sea urchins. Cod is harvested using several gear types, but primarily it is harvested with gillnets in this area. Table 5.2 shows the quantity of the harvest by each gear type for the 2003-2006 periods.

Gear	Tonnes	% of Total
Stern otter trawl	79.8	0.9%
Beach and bar seine*	32.6	0.4%
Tuck seine	22.3	0.2%
Purse seine	666.4	7.4%
Gillnets (set)*	5,265.6	58.5%
Longlines*	331.1	3.7%
Handlines*	246.5	2.7%
Trap*	110.5	1.2%
Pot*	1,764.5	19.6%
Dredge / drag	401.7	4.5%
Diving	28.5	0.3%
Hagfish barrel*	45.2	0.5%
Other	4.7	0.1%
Total (Average)	8,994.6	100.0%

#### Table 5.23PS Harvest by Gear Type, 2003-2006 Average

Note:

\* Fixed gear

The locations of the subset of georeferenced fixed and mobile gear fisheries are shown on the following maps (Figures 5.19 and 5.20). In general, industrial activities and vessel traffic have a greater potential to conflict with fixed gear fisheries than with mobile gear.



 Figure 5.19
 2003-2006 Recorded Fishing Locations, All Months, Fixed Gear, Aggregated

 Source: DFO
 Image: DFO



 Figure 5.20
 2003-2006 Recorded Fishing Locations, All Months, Mobile Gear, Aggregated

 Source: DFO



Figure 5.21 Shipping Lanes – Placentia Bay, NL

## Fishing Enterprises and Fishing Licences

There are 477 core fishing enterprises in Placentia Bay (DFO's Fishing Area 10) and 51 noncore enterprises. A core fishing enterprise is a commercial fishing enterprise holding key species licenses, under a system established by DFO in 1996. A non-core enterprises is one that holds other (perhaps single) species licenses.

The majority of the core enterprises are less than 35 foot LOA, i.e., 379 enterprises are less than 35 feet in length' and 98 are in the 35 - 64 foot LOA category. All (51) of the non-core enterprises are less than 35 feet.

The number of license held by both core and non-core enterprises are shown in Table 5.5. The table also includes the 304 recreational licenses. More detail is provided in Appendix D.

Species	Total Licences
Bait	371
Capelin Fg	100
Capelin Ps	1
Eel	6
Groundfish Fg	518
Herring Fg	124
Herring Ps	10
Lobster	345
Mackerel Fg	105
Mackerel Ps	8
Salmon Atlantic	5
Scallop	225
Scallop Recreational	265
Seal	53
Seal Personal Use	42
Snow Crab Inshore	401
Snow Crab Supplementary	68
Squid	245
Tuna Bluefin	4
Whelk	86
Total	2,982

 Table 5.3
 Core, Non-core and Recreational Licences, Placentia Bay (2003)

# 5.3.2 Vessel Traffic Lanes: Conflict with Fish Harvesting

During meetings between fishers and NLRC, many fishers spoke of the ongoing effects of the vessel traffic lane on fishing activities and their concern that the increase in tanker traffic associated with the refinery project would make fishing even more difficult, even, some suggested, impossible. Fishers also made the point that they have been raising this concern for years. In recognition of the potential conflicts among marine users in Placentia Bay, several years ago the Placentia Bay Traffic Committee was established. Chaired by CCG, the

Committee continues to provide a useful forum for marine users to identify, discuss and, where possible, resolve various traffic-related issues.

# History of the Traffic Lane

The vessel traffic management system was established several decades ago, shortly after the existing refinery was commissioned in the late 1960s. At that time, fishers were consulted regarding the most appropriate route for the traffic lane. The current route was selected primarily for its deep water but also because, at the time, there were very few fishing activities in this part of Placentia Bay: at that time, the fishery focused on cod, mainly in inshore areas and there was no fishery for snow crab.

The present vessel traffic lane is formally referred to in the Canada Shipping Act Regulations as the Vessel Traffic Services Zone. Guidelines in Rule 10 in the associated Collision Regulations govern all vessel activities in a Vessel Traffic Services Zone and/or the relevant Traffic Separation Schemes. This document will typically use vessel traffic lanes or VTSS to refer to the system.

The federal government is responsible for establishing, monitoring and enforcing marine traffic and vessel regulations and procedures. Transport Canada has stated that the Placentia Bay vessel management system is not a significantly busy marine traffic zone compared to other vessel traffic management systems in Canada and elsewhere in the world and that it has ample capacity to accommodate the expected increase in traffic in Placentia Bay (associated with the refinery and other potential projects presently under assessment).

The VTSS is managed through the Placentia Marine Communications and Vessel Services Centre. Placentia MCTS, called Placentia Traffic, tracks, monitors and regulates tanker and other commercial traffic movements in the Bay. The Centre also monitors any fishing vessels that are detected on radar at the Centre or that report in on VHF radio.

In the present vessel traffic management system, all commercial vessels over 20 m LOA (Length Overall) are required to call in to the Traffic Centre. However, only fishing vessels over 24 m LOA must call in and be a part of the traffic system.

The vast majority of the vessels in the Placentia Bay fishery are less than 24 m and, as such, are not required to participate in the vessel traffic management system. In discussions between fishers and NLRC, many if not most indicated that they did not use the MCTS centre services.

For example, the Fish, Food and Allied Workers of the Canadian Auto Workers (FFAW) survey found that while most (more than 80%) of the fishers surveyed have VHF radios on board, only about 44% called in to the Marine Communication Traffic Services Centre for information before crossing or working in the lanes. Survey participants also indicated that only about 30 % kept a listening watch while in or near the lanes. Only 24% of those surveyed have radar and, even

then, in meetings with NLRC, it was pointed out that an ongoing radar watch was not practical while deploying or hauling gear.

## Snow Crab Fishery

As the nature of the fishery changed following the moratorium, the snow crab fishery was established (starting in about 1996) and is now one of the most economically important in Placentia Bay. Snow crab grounds are in deep water and information from fishers show that the harvesting area for crab extends throughout much of the traffic lanes (Figures 5.15 and 5.16).

The crab fishery is an individual quota-based fishery and the allowed season is very short, leading to a concentration of effort and congestion on good crab fishing grounds. The crab season is shown in Figure 5.8 and the significant economic contribution in Table 5.1.

## Extent of Interference

The actual extent of conflict between vessel traffic and crab fishing in use of the area in and around the traffic lanes has not been documented. The map prepared from fishers' information suggests that there may be considerable overlap between crab grounds and the vessel traffic lanes and this was supported by anecdotal information provided during meetings between fishers and NLRC. Fishers described many incidents of close-calls or near-misses with tankers during crab fishing as well as incidents of damaged or lost gear. In most if not all cases, the incident was not reported to Placentia Traffic.

The MCTS Centre records all reported incidents as Marine Occurrence Reports. Such incidents include such situations as disabled vessels, overdue vessels reports, pollution, vessel defects and close-quarters events. During the past five years, the Centre has filed 1 351 reports (Placentia Bay Traffic Committee, April 4, 2007 meeting minutes). Only three incidents reported (out of 1 351) were close-call situations, and two of these were in Placentia Bay. In meetings with NLRC, fishers stated that typically near misses were not reported. Without this information, the official record may not be an accurate representation of the actual situation.

The FFAW survey indicates that two thirds of fishers interviewed stated they have been effectively displaced from some of their fishing grounds by tanker traffic (both in the traffic lane and in areas designated as anchorages). The concerns are personal safety, having enough time to set or haul gear and gear loss or damage.

As stated earlier, one of the criteria in selection of the vessel traffic lane route was deep water. Crab grounds are also located in deep water, with the best grounds usually at a depth of 200 m or more. While deep water alone does not necessarily indicate good crab grounds, the percentage of deep water in Placentia Bay taken up by the VTSS was calculated as a potential tool in understanding the extent of interference and overlap between the crab fishery and the traffic lanes.

The VTSS occupies about 11 % of the total marine area of Placentia Bay, i.e. 2 684 sq km of the almost 24 000 sq km of marine area. Most of this area is south of Red Island. Of specific interest to the situation with snow crab are areas of the seabed that are located deeper than 200 m: there are about 4 463 sq km of seabed area covered by water deeper than 200 m (or 19 % of the Bay). The VTSS lanes occupy almost 29 % of all the water in Placentia Bay that is deeper than 200 m.

In the outer Bay, the deep water is concentrated in the western part of the VTSS and also farther west and south of the lane. Figure 5.15 based on DFO geo-referenced data shows a concentration of crab effort at the entrance to the VTSS and the FFAW data indicate grounds extending to the west and south, more or less following the deep water(Figure 5.16).

In the inner Bay, the traffic lanes occupy almost 40 % of the crab grounds, that is, water deeper than 200 m. While there are other areas of deep water (potential crab grounds) to the west of Merasheen and Long Island, many of the fishers who typically fish crab in or near the lanes do so due to preference or because it is impractical (or too costly or unsafe) to travel from their home ports to these more distant grounds. This may be especially the case for fishers operating vessels less than 35 feet in length (e.g., 26-foot speedboats).

# Crossing the Traffic Lanes

Fishers also spoke of concerns for their safety while crossing the traffic lanes. The survey by the FFAW on behalf of the Refinery Project found that fewer than half of the survey respondents contacted Placentia Traffic prior to crossing the lanes and fewer yet monitored traffic continuously by radio or radar while in the lanes, in some cases for practical operational reasons.

The survey also collected information to determine if there are specific areas where vessels cross the traffic lanes with a view to being able to advise tankers travelling through the Bay of crossing areas. The information collected is shown in Figure 5.21 and suggests that additional effort into collecting this information might provide a useful basis for such a notice.

### NLRC Role

In meetings with NLRC and in the discussions with FFAW while developing the fishing activity maps, fishers indicate that fishing (in particular for crab) takes place in and near the traffic lane and that, even with existing levels of traffic, they have serious concerns about personal safety, gear loss and damage and also their ability to deploy and haul gear safely and effectively. NLRC acknowledges that the vessel traffic associated with the proposed Refinery will exacerbate the situation already faced by fishers in association with the traffic lane.

If the Project is approved, site preparation and construction of the Refinery will take about three years to complete with the Refinery operational in 2011. During this time, NLRC will continue to

work diligently and openly with area fishers and the FFAW to find ways to maximize the possibilities for the safety and effectiveness of fishing activity.

In the immediate area around the Refinery's marine terminal, NLRC will work directly with fishers who have traditionally used this area to develop communication and operational protocols, gear and vessel damage policies and compensation arrangements.

NLRC will be considering its own vessel traffic during a detailed scrutiny in the TERMPOL Review process. However, outside the immediate area of the Marine Terminal, NLRC is only one member of the multi-user marine community of Placentia Bay. NLRC will also continue to participate on the Placentia Bay Traffic Committee, the established forum for marine users of Placentia Bay.

# Placentia Bay Traffic Committee

As mentioned earlier in the section, the Placentia Bay Traffic Committee provides an effective forum for addressing marine traffic issues with a focus on quick action to resolve potential or actual conflicts and issues.

Over the years, the Committee has addressed traffic-related issues through a combination of voluntary policies and procedures and monitoring implementations of regulations. Membership is open to all marine users of the Bay. The industrial operations that are or would be adding tanker traffic to the Bay (the existing refinery, the crude oil transshipment terminal, the proposed refinery and proposed LNG transshipment terminal) participate on the Committee as do key agencies involved in regulation, monitoring and management of the VTSS.

# FFAW Placentia Bay Sub-committee

The level of tanker traffic in Placentia Bay has been steadily increasing over the past several years and, at present, there are three potential new industrial projects proposed for the bottom (north end) of the Bay which could more than double the number of vessels currently using the traffic lanes. In response to concerns of fishers, the FFAW-established a specific senior level sub-committee to monitor the projects and work with the project proponents.

NLRC has met on several occasions with the Sub-committee and Sub-committee member have facilitated introductory meetings between the fishers and NLRC. The Sub-committee provides a valuable sounding board for NLRC and an important entry point for consultation with area fishers. The Sub-committee provided management and advice during the surveys of harvesters to develop the fishing activity maps and data on existing effects of the traffic lane on commercial fishing.

### 5.3.3 Fish Harvesting in the Refinery Area

Since so little of the catch data is specifically geo-referenced and indicated on the preceding maps, the following analysis was undertaken to provide a better indication of the locality of fishing effort. This looks particularly at fisheries activities in the general vicinity of the proposed refinery site, particularly near the proposed marine facilities. This analysis considers, for 2003-2006, the quantity of the harvest from the waters of 3PSc, (1) by the recorded Statistical Section (SS) of the fishing vessel's homeport, and (2) by the Statistical Section of the port where the catch was landed (port of landing).<sup>10</sup>

The DFO datasets indicate fishing vessel homeport SS for about 61 percent of the 2003–2006 catch (by quantity) harvested in UA 3PSc. Of this subset, more than 97 percent (by weight) is harvested by vessels registered in ports in Placentia Bay (i.e., ports within SS 29 - 32, indicated on the following map, Figure 5.22. Figure 5.23 compares the quantity of the harvest in 2003-2006 for the different Placentia Bay Statistical Sections (SS 29-32) and those immediately adjacent to Placentia Bay (SS 28 and 33).

<sup>&</sup>lt;sup>10</sup> DFO Newfoundland and Labrador Region does not disclose the specific homeport or port of landings for confidentiality reasons.



Figure 5.22 Placentia Bay and Area, Location of Statistical Sections



Figure 5.23 2003-2006 Placentia Bay Harvest by Vessel Homeport Statistical Section

Source DFO

The SS of the port of landing of the harvest (i.e., where it is brought to port and off-loaded) is indicated for 100 percent of the 3PSc catch. These locations range more broadly, indicating that the Placentia Bay harvest is landed in many ports around the Island of Newfoundland and in Nova Scotia. For 2003-2006, though, 87 percent of the harvest was landed in Placentia Bay ports (though this does not mean it was processed there). Figure 5.24 compares the quantity of the harvest landed in 2003-2006 in the Placentia Bay Statistical Sections (SS 29-32) and those immediately adjacent to Placentia Bay (SS 28 and 33).





# Refinery Area

As Figure 5.23 indicates, boats from SS 30, which contains the proposed refinery site, recorded the greatest proportion of the recent Placentia Bay harvest. Figure 5.24 shows that SS 30 ports also received close to the greatest proportion of the bay's landings that year.

Tables 5.4 and 5.5 show the quantity and value of the harvest by species in 2003-2006 (averaged) for vessels reported as based in SS 30 homeports, and the quantity and value of the 3PSc harvest landed in SS 30 ports. (Values are calculated based on the average annual quantities of landings for 2003-2006, applying recent prices. Specifically, these prices are the average landed amounts paid to harvesters in 2006, averaged over all months, for relevant species within the Newfoundland and Labrador Region<sup>11</sup>).

<sup>&</sup>lt;sup>11</sup> See http://www.nfl.dfo-mpo.gc.ca/publications/reports\_rapports/Land\_All\_2006.htm

pecies Tonnes		Value
Atlantic Cod	1,108.1	\$1,280,342
American Plaice	30.4	\$21,214
Winter Flounder	7.5	\$3,108
Skate	5.2	\$1,508
Herring	26.4	\$5,388
Capelin	22.7	\$6,378
Sea Scallops	4.5	\$7,561
Whelks	22.5	\$22,149
Lobster	43.4	\$478,592
Snow Crab	248.5	\$529,609
Lumpfish Roe	21.1	\$41,951
Other	6.8	\$8,554
Total	1,540.4	\$2,397,800

#### Table 5.43PSc Recorded Harvest by Vessels from SS 30 Ports (2003-2006 Averages)

#### Table 5.5 3PSc Harvest Landed in SS 30 Ports (2003-2006 Averages)

Species	Tonnes	Value
Atlantic Cod	1,608.4	\$1,858,421
American Plaice	49.3	\$34,406
Winter Flounder	17.6	\$7,238
Skate	7.2	\$2,078
Herring	349.2	\$71,237
Capelin	56.2	\$15,822
Sea Scallops	10.1	\$17,076
Sea Urchins	19.5	\$25,947
Lobster	46.2	\$509,117
Snow Crab	184.1	\$392,454
Lumpfish Roe	16.9	\$33,470
Other	13.0	\$16,351
Total	2,364.8	\$2,983,616

In the ports between Southern Harbour and Garden Cove (in the general vicinity of the proposed refinery location), there are 92 Core fishing enterprises (based on 2003 records). Of these, nearly 80 percent use vessels less than 35 feet in length. In general, these smaller fishing boats tend to fish closer to shore than the larger boats and closer to their home ports and/or ports of landing.

This suggests that – despite the gaps in the mapped georeferenced data – the inshore areas in the general vicinity of the proposed refinery site (i.e., inner Placentia Bay) are likely very busy

with small boat harvesting activities, such as lobster, cod and herring fishing, and these fishers are responsible for harvesting a significant part of the 3PSc resource.

In particular, the lobster fishery (which is 0 percent georeferenced) is known to occur relatively close to the fishers' home wharves, along rocky shorelines and nearshore islands, using small boats (Figure 5.22). This fishery – while making up less than 1 percent of the overall 3PSc harvest by quantity in 2003-2005 – accounted for almost 7 percent of the value of the bay's harvest. Within SS 30 ports, lobster represented more than 19 percent of the value of their catch.





# 5.3.4 Placentia Bay Aquaculture

# Development of Placentia Bay Aquaculture Activities (1997-2007)

To date, the majority of the aquaculture development and investment activities in southern Newfoundland have been concentrated in the Bay d'Espoir and Fortune Bay areas. In 2000, the province's aquaculture Strategic Plan noted "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, 2007) However, DFA aquaculture managers now believe that Placentia Bay has many of the desirable characteristics of Bay d'Espoir. As such, they are

confident that Placentia Bay has significant growth opportunities, including possibilities for the development of salmonid farming, as well as further expansion of existing cod and mussel operations.

The development of aquaculture resources in Placentia Bay has been under way since the mid-1990s. In 1997 there were seven active aquaculture operations and several applications to investigate and/or develop additional sites. (Two sea urchin sites were later approved but by 2003 these were no longer active. A cod hatchery was established in Placentia Bay in the early 1990s but was destroyed by fire.)

During 2000-2003, DFA reported a relatively significant level of expansion in the Placentia Bay aquaculture sector and a considerable interest in the development of new mussel and cod farming 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.<sup>12</sup> At that point, most of these aquaculture sites were still 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.<sup>13</sup> Nevertheless, based on discussions with DFA experts and 2004 production and sales data obtained from selected aquaculture enterprises, the annual value of aquaculture production (after primary processing) in Placentia Bay was estimated at \$500,000. (Canning and Pitt Associates, 2005)

In 2006 a detailed analysis of aquaculture operations in Placentia Bay was undertaken as part of a larger comprehensive study of oil spill risk assessment within the South Coast – Eastern Avalon region prepared for Transport Canada. (Canning and Pitt Associates, 2007) This study, based on data obtained from detailed consultations with industry participants as well as DFA experts, calculated current (2006-2007) mussel production levels in Placentia Bay at 3.5 million pounds with a primary product value (before processing) of \$1.4 million. These data were based on current production levels at the five commercially-active mussel farming sites within the Placentia Bay study area.

<sup>&</sup>lt;sup>12</sup> As of 2004, there were still no full-cycle ("egg to plate") cod aquaculture operations in the province, and all cod enterprises are thus "grow-out" facilities. However, current production of farmed cod is limited because of restrictions on taking wild cod for any purpose (DFA managers, pers comms., 2004)

<sup>&</sup>lt;sup>13</sup>These included a cod farming facility on Jerseyman Island, two blue mussel farms at Crawley Island/St. Croix Bay and another mussel operation on Merasheen Island.

The annual value of aquaculture production within Placentia Bay is still relatively small compared to other areas where fish farming has been under development for a much longer period. For example, the study prepared for Transport Canada estimated that, in 2007, salmonid production in the Bay d'Espoir-Fortune Bay region will be about 6,500 tonnes with a primary product value of \$34.5 million. By 2008, production levels in that region are expected to more than double, to 14,700 tonnes, which, at current product market values (\$5,315 per tonne) would be worth an estimated \$78 million.

## Placentia Bay Aquaculture Sites and Activities (2007)

According to the most recent (April 2007) DFA data there are currently 13 licensed aquaculture operations within Placentia Bay. DFA managers report that, if an aquaculture site is licensed, it is deemed to be "active", even though it may not be at the commercial production stage, i.e., currently selling its product. It was also noted that, although their licences have been renewed annually, most of the Atlantic cod operations have had little or no activity over the past several years due to moratoria. Further, most of the area's cod sites are classed as "developmental" licences (for reasons related to the original intent of the cod grow-out sector and associated land tenure issues). DFA managers also note that even "developmental" mussel licences are considered active since these operations have gear deployed in the water, and hence "aquaculture" is being conducted (T. Budgell, pers comm., August 2006). Applications for another eight sites are awaiting DFA approval. DFA notes that there is no guarantee that all of these applications will receive final approval (T. Budgell, pers comm., August 2006 and April 2007).Currently licensed sites include five mussel farming operations and eight Atlantic cod grow-out sites.

Figure 5-26 shows the geographic location of existing aquacultural sites in Placentia Bay, and Table 5.6 provides relevant, more detailed information on these mussel and cod farming operations.



Figure 5.26 Existing Aquaculture Sites in Placentia Bay (2007)

### Other Inactive/Abandoned Aquaculture Sites

In addition to the sites that DFA has currently approved, during the past decade or so aquacultural activities have been investigated, approved and developed at various other locations within Placentia Bay. While none of these older aquaculture sites are active or under development, some of these farming locations may be re-activated at some point in the future. Previously active or licensed aqauculture sites within the study area are shown below, and may give some indication of the potential for a more widespread development of the area's aquaculture sector in the future.<sup>14</sup>

Previous aquaculture sites (number) and species activities were located at the following sites:

<sup>&</sup>lt;sup>14</sup> Information on these sites was obtained from DFA licence files (2003/2004), AquaGIS.com data, and Todd Budgell, pers comm., August 2006.

#### **Blue Mussels**

- Bar Haven (3)
- Gulch Head
- Cross Island

### Atlantic Cod

- Fox Cove
- Jigging Cove (near Monkstown)
- Spanish Room Point
- Petite Forte Harbour (2)
- Muddy Hole, Sound Island
- Chambers Island (3)
- Isle Valen (3)

### <u>Salmon</u>

- Northeast Nonsuch Arm
- Boat Harbour

### Sea Urchins

Cooper Island

# Current Status of Aquacultural Production Activities in Placentia Bay

Consultations with all operators involved in the Placentia Bay aquaculture sector were undertaken (in November 2006 and April 2007) to obtain further information about the current status of these farming operations, including their current production levels, future plans and any concerns related to the proposed Refinery at Southern Head.

The following table presents an overview of recent activity levels, current licence status and economic output of DFA approved aquaculture sites. This table updates baseline information obtained from DFA based on consultations with industry participants. (Appendix A provides a list of all industry participants and agency managers consulted for this report.)

### Table 5.6 Current Activity Status of Placentia Bay Aquaculture Sites (April 2007)

Company/Operator	Location	Species	Current Status
Keating, Joseph (Baie Sea Farms)	Crawley Island, Long Harbour	Blue Mussels	Operation has had commercial sales for the last 5 years or more; owner has plans to expand production from current levels
Keating, Joseph (Baie Sea Farms)	Crawley Island	Blue Mussels	Operation has had commercial sales for the last 5 years or more; operator has plans to expand production from current levels

Company/Operator	Location	Species	Current Status
Keating, Joseph (Baie Sea Farms)	St. Croix Bay	Blue Mussels	Operation has had commercial sales for the last 5 years or more; operator has plans to expand production from current levels
Warren, Christopher J.	Big South West Cove, Merasheen Island	Blue Mussels	Operation has had commercial sales for the last 5 years or more; operator has applied to DFA for site expansion, expects to increase production of mussels
Warren, Christopher J.	Merasheen Island	Blue Mussels	Operation has had commercial sales for the last 5 years or more; operator has applied to DFA to add oyster farming activities to the site
Hollett, Mervin	Port Royal Arm	Blue Mussels	Licence status/approval is uncertain pending DFO review of objections from scallop fisher(s) operating near the site; no commercial sales to date; operator hopes to begin mussel farming in 2007 or 2008 if DFA/DFO approvals are obtained; if so, operator anticipates commercial sales of 400-500,000 pounds in 4-5 years
Leonard, Peter	Southern Harbour	Atlantic Cod	Licence has been renewed but no commercial sales to date; operation presently inactive, no equipment on-site; operations may resume pending DFO allocation of cod for grow-out; potential for commercial sales will depend on the same factors that have affected growth of other PB cod grow-out operations (availability of growing stock, feed supply and market conditions)
Norman, Bernard	Jerseyman Island	Atlantic Cod	Licence has been renewed, but operation is currently inactive, no commercial sales to date; equipment (four Polar cages) still on- site; operator hopes to begin farming steelhead trout in 2008
Pomeroy, Donald A. and Barry, John Jr.	Petite Forte Harbour	Atlantic Cod	Licence status is uncertain and operator is awaiting word from DFA and NWPA application renewal; no equipment presently on-site; operator may renew cod farming if approvals are forthcoming
Jones, Ambrose	Petite Forte	Atlantic Cod	Licence status uncertain; operator reported commercial sales for two or three years, but ceased cod farming activities in 2004; owner not sure if operations will resume in future
Merasheen Mussel Farms Inc.	Barren Island	Blue Mussels	Awaiting DFA approval
Merasheen Mussel Farms Inc.	Jean de Gaunt Island	Blue Mussels	Awaiting DFA approval
Merasheen Mussel Farms Inc.	Presque Harbour	Blue Mussels	Awaiting DFA approval
Merasheen Mussel Farms Inc.	Rose au Rue	Blue Mussels	Awaiting DFA approval
Merasheen Mussel Farms Inc.	Dog Harbour	Blue Mussels	Awaiting DFA approval
Merasheen Mussel Farms Inc.	Merasheen Island	Oyster	Awaiting DFA approval; operator has applied to add oyster activities to existing

Company/Operator	Location	Species	Current Status
			mussel operations at this site
Warren, Christopher	Big South West (Expansion)	Blue Mussels	Awaiting DFA approval (expansion of existing site already licensed by DFA)
Moulton, Clayton	Flat Island Harbour	Atlantic Cod	DFA licence has lapsed; site was commercially active for only one year (2001-2002)
Pevie, Joseph and Pearson, Christopher	Woody Island	Atlantic Cod	No commercial sales since 2001; licence lapsed in 2006
Pomeroy, Donald A. and Barry, John Jr.	Gaultoin's Cove (near Great Paradise)	Atlantic Cod	Operator reports that DFA licence for this site has probably lapsed; last commercial sales were in 2003
Sapphire Sea Farms Ltd.	Dunville	Atlantic Cod	DFA reports that site licence lapsed several years ago

Source:

DFA, Newfoundland and Labrador (DFA Grand Falls, April 2007); Canning and Pitt, Inc. industry consultations November 2006 and April 2007

As indicated in the above table, although there are some 13 DFA-licensed aquaculture sites within the study area, only five of these are presently in commercial production. All of the commercially-active operations are engaged in mussel farming; the remaining sites – all of which are licensed for Atlantic cod – are currently not in production, and several of these operations have not renewed their licences. As indicated in Table 5.6, applications for an additional eight sites are being reviewed by DFA; all of these applications are for mussel farming, with one exception (i.e., one firm has applied to add oyster farming activities to its existing mussel farming site on Merasheen Island).

None of the existing Atlantic cod grow-out operations are in commercial production and most have not had product sales for the past 3-4 years (J. Pevie and A. Walsh, pers comms., November 2006; A. Jones, D. Pomeroy, M. Hollett, P. Leonard, B. Norman and C. Moulton, pers comms., November 2006 and April 2007).

Licences for three of the cod sites (at Flat Island Harbour, Woody Island and Gaultoin's Cove) have either lapsed or have not been renewed. The licence status of two other cod farming sites is "uncertain", while the operator of another currently-licensed cod site (at Jerseyman Island) is considering switching to steelhead trout in 2008.

Consultations with licence holders indicate that cod farming has not proven to be economically feasible, and only one operator anticipates resuming his cod farming 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 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.

In contrast, Placentia Bay mussel farmers are relatively optimistic about the potential for their sector, and both of the current operations have plans to expand their production levels (J. Keating, pers comm., November 2006; C. Warren, pers comm., November 2006). As indicated in Table 5.6, DFA is now considering applications from one firm to develop five new mussel farming sites, and that applicant says he expects to have marketable product available in about two years. The owner of that company has also applied to expand his existing mussel farming operation at Big South West (on the west side of Merasheen Island).

Within the past year or so, Cook Aquaculture has expressed some interest in developing new cod and salmonid farming operations in Placentia Bay. However, company managers indicated that they are still in the process of collecting preliminary data and exploring potential sites and thus, the company has no specific investment plans at this point (N. Halse, pers comm., April 2007).

Of the five commercially-active mussel farms in Placentia Bay, three are situated near Crawley Island in Long Harbour and the other in St. Croix Bay; these three sites have been under active development since the late 1980s. The remaining two mussel-producing sites are located in the central islands area of the bay; one is situated at Big South West on the west side of Merasheen Island and the other is on the east side of this island, just north of Dog Harbour, in the central channel between Merasheen Island and Long Island.

These five commercially-active mussel farming operations range in size from 3.5 hectares to 150 hectares and, together, have a 2006-2007 production capacity of about 3.5 million pounds of marketable product. Their harvesting/sales season is from November to May-June, though one enterprise anticipates that most of its 2007 sales will take place during the January-April period. Total investment (all five sites) in production equipment and gear (ropes, buoys and collector socks, but excluding harvesting vessels) is estimated at about \$1.2 million; based on the total area under production, this investment averages about \$3,478 per hectare.

# 5.3.5 Fish Processing

### Locations

The locations of fish processing plants in the Placentia Bay and adjacent areas for 2006 are shown in Fig. 5-27, based on DFA (2007). The second map (Fig. 5-28) shows locations in 2004 in Placentia Bay and the South Coast by plant classification, based on Dunne (2004). However, the ownership and operation of some plants in this area (and other areas) are in transition, and their future structure and numbers are not settled.





Source: DFA, 2007



Figure 5.28 Southern Newfoundland Fish Processing Licence Locations by Category (Dec. 2004)

Source: Dunne, 2004

Many of the existing processing plants in Placentia Bay have received significant portions of their raw material inputs from fishing enterprises and suppliers from fishing areas beyond UA 3PSc. For example, FPI's major Marystown facility has traditionally obtained >90 percent of its fish inputs (primarily flatfish species) from offshore sources, in fishing areas beyond Placentia Bay, and some from outside the DFO Region.

On the other hand, some of the fish harvested from 3PSc goes to plants outside Placentia Bay for processing, even if it is landed there.

### **Processing Value**

Most of the species sold to various processors and buyers are subsequently processed into a variety of final products and sold into various markets, at prices that vary according to product type and mix, quality, exchange rates, market demand, and so on. Depending on its particular production costs, overhead structure, desired profit margin, etc., a processing firm may be able to sell its final output for a higher price compared to another operator, or at a higher profit margin. Also, large quantities of lobster are purchased directly from fishers and then resold without ever being "processed." Hence, a significant portion of the final value of several species is not captured in local plant production figures.

There is no reliable way to establish the final, or export, value of all of the fish caught in 3PSc. Some portion – or all – of most species sold to processors and buyers are subsequently processed into a variety of final products and sold into various markets, at prices that vary according to product type and mix, exchange rates, market demand, quality and so on. Depending on production costs, overhead structure, desired profit margin, and other factors, a processing firm may be able to sell its final output for a higher price than another operator, or at a higher profit margin than another processor.

Provincially, DFA calculates the value of fish after processing by applying average market prices to the quantity for the species; however, this excludes the value added through secondary processing.

A rough estimate of the value can be derived by assuming that primary processing adds an additional 65.26 percent of the landed value. This is based on recent average provincial-level data for landings and processing values for all species. Thus for 3PSc fish harvested by SS 30-based vessels, averaged over the past four years, the additional value added by processing (wherever it is eventually landed and processed) would be in the order of \$1,564,804 (65.26 percent of \$2,397,800), for a total of \$3,962,604. Since not all landings data are linked to specific home ports, discussed above, the actual value would likely be higher.

# 5.4 **Project Effects and Mitigation**

### 5.4.1 Background

Commercial fish harvesting activities occur in the Southern Head area and extend throughout Placentia Bay.

NLRC, in conjunction with the Fish, Food and Allied Workers Union, had an initial round of discussions with Placentia Bay fishers in early 2007, meeting with them in communities around the Bay. Fishers identified several existing and on-going issues and concerns already faced by harvesters in Placentia Bay: safety, especially in association with the vessel traffic lane and the resulting displacement from traditional fishing grounds; risk of an oil spill; and gear loss and damage. The fishers need the EIS to address the potential increased effect of the Refinery project relative to these concerns.

In order to have a thorough understanding of commercial fish harvesting in Placentia Bay, NLRC has sought to have it described from the points of view of fisheries management as well as from the fishers themselves. Both viewpoints are presented in the preceding description of the existing fisheries environment and are considered in the effects assessment.

For commercial fisheries, the issues considered here 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 fish to buyers.

Commercial fishing activities occur throughout the bay, and at different times throughout the year. Some of these activities are associated with local nearshore habitat (e.g. lobster harvesting) and others are more generally fished throughout the bay, much farther from shore.

Fishing grounds in the immediate Project area are used for the harvest of a variety of species, primarily lobster, lumpfish, cod, capelin, blackback flounder, scallop and sea urchins. Quantities of mackerel, herring and squid have also been taken in this area (based on research undertaken by the FFAW). The IPA is fished during most of the year, with the possible exception of March; however, fishing activities vary throughout the course of the season depending on the species being harvested.

Fishers report that the IPA is particularly important for four main species: lobster, cod, sea urchin and scallop. The majority of the fishers actively using these grounds are from five communities: Come by Chance, North Harbour, Garden Cove, Arnold's Cove and Southern Harbour. Seventy-two < 35' Core Enterprises are based in these five communities. Not all of these fishing enterprises have established harvesting activities and fishing grounds in the IPA.

For aquaculture operators, this assessment considers 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.

Aquaculture operations have tended to concentrate in the more sheltered areas of northern Placentia Bay, where blue mussel farming is undertaken. There are currently no aquaculture operations in the IPA.

For fish processors, the chief aspect considered is "security of supply" of raw materials for processing and sale to mid-and-downstream buyers. Fish processing, while located in some communities around the bay, often rely on raw materials from more distant waters beyond 3PSc.

The following Interaction Matrices identify Project activities (Construction and Operations Phases) that could interact with the commercial fisheries VEC, presented in terms of fisheries (i.e. harvesting), aquaculture and processing. The interaction matrices make no assumptions about the potential effects of the interactions but provide the focus for the effects assessment (Table 5.7).

Table 5.7	Interactions Matrix – Routine Activities,	<b>Construction Phase</b>
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Environmental Considerations	Project Activities		Valued Ecosystem Components			
Key to Interaction Rating:			C	Commercial Fisheries		
0 No interaction Y Potential interaction			Harvesting	Aquaculture	Processing	
CONSTRUCTION						
Effect	Pathway	Activity				
Lost fishing grounds Cons arou relat	Construction activity around Project site and related safety zones	Marine terminal	Y	0	Y	
		Intake	Υ	0	Y	
		Outfall	Υ	0	Y	
Gear damage	Vessel traffic	Construction and support vessels	Y	0	Y	
	Debris and siltation	Construction activities	Υ	Y	Y	
Fish scaring (reduced "catchability")	Noise	Pile driving, underwater drilling, other construction	Y	0	Y	
		Vessels	Υ	0	Y	
Interference / lost opportunity Vessel traffic; deviation around construction zones		Inshore wharf and causeway construction	Y	0	Y	
		Offshore berthing facilities				

In the following sections, potential effects during construction and operations are discussed, feasible and appropriate mitigations are identified, and the residual effects of the activity (after mitigation) are assessed. Table 5.8 (Construction) and Table 5.9 (Operations) summarize the effects assessments, and provide the determination of significance of residual effects after mitigations are applied.

## 5.4.2 Construction Phase (Marine Terminal)

Before the start of marine construction activities, NLRC will establish a Construction Safety Zone (CSZ) of approximately 500m x 1000m in the Come by Chance Point nearshore area. This exclusion zone will encompass the marine area in which the construction dock/tug berth, and later the jetty, will be built. For safety and security purposes, and also 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 Construction Dock is operational, expected to be September 2009. Part of the CSZ will sty in place until completion of the jetty at the end of 2010.

In addition, two other CSZs will be established for the installation of the seawater intake at Holletts Cove and for the outfall pipe off Southern Head. Both of these components will be installed at the same time. The safety zone for the intake pipe will be approximately 100m x 1000m, and the zone for the outfall will be approximately 100 m x 250 m. Fishers will have to avoid both of these marine construction areas during the three months or so they will take to install.

At any given time, there would likely be no more than six vessels operating concurrently on the marine wharf. The noise from ships associated with construction is not expected to be different from those usually associated with other vessels in the bay, such as fishing boats and other marine industries.

While the fish and shellfish habitat in the Project area is not unique, mapping of fish harvesting locations by fishers indicate that some fishing is conducted in the Project construction areas. The same fisheries are conducted in many other localities that will not be affected.

All construction activities will be carried out in accordance with the EPP for construction and in compliance with all applicable permits (for example: *Navigable Waters Protection Act*, DFO HADD and DOEC Alteration to a Body of Water permit.)

### Project Effects: Commercial Fish Harvesting

### Lost Fishing Grounds

*Issues:* The temporary exclusion of fishing from within the marine construction area "footprint" because of activity levels area around the jetty construction and the construction of the intake
and outfall facilities will represent the temporary loss of harvestable grounds used by some fishers.

#### Gear Damage

*Issues:* Construction-related vessels could transit through and damage fixed fishing gear. (Mobile gear should not be an issue as fishing vessels and Project vessels should be aware of each other.) Debris from construction might float into fixed gear and damage it. This could have an adverse effect on fisheries.

#### Fish Scaring

*Issues:* Marine construction activities will create sound in and near the water, in particular pile driving and installation of rock anchors. 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).

#### Interference / Lost Opportunity

*Issues:* Construction-related vessels could cause interference with fishing boat transits en route to or from fishing grounds along the shoreline within the IPA. There could be increased safety risks for fishers in the vicinity of Come by Chance Point/Holletts Cove, or elsewhere near the construction site. Avoiding the area of activity could require longer transit times to fishing grounds and increased expenses.

#### Mitigation: Commercial Fish Harvesting

#### Loss of Fishing Grounds

Design and Location of Marine Components. The consultation process for this Assessment led to changes in Project plans designed to minimize the area of fishing grounds affected by the construction (and operational) footprint. As a specific fisheries-related mitigation NLRC reconfigured the design and position of its marine facilities and infrastructure in order to avoid encroachment on locally-important cod grounds to the south of Come by Chance Point.

*Fisheries Liaison Committee.* Before the start of construction activities, following Project approval, NLRC will establish a Fisheries Liaison Committee (FLC) to facilitate and formalize its ongoing fisheries-industry consultation process. The FLC will be mandated to advise NLRC on all aspects of the marine facilities construction phase as they relate to fisheries operations. This will help to ensure that potential negative effects are addressed and minimized to the extent that this is possible. The FLC would include representatives of the FFAW as well as individual area fishers and aquaculture operators.

*Fisheries Liaison Manager.* NLRC will employ the services of a full-time, dedicated Fisheries Liaison Manager (FLM) to develop, maintain and facilitate a close working relationship between NLRC, and its sub-contractors, and all fishers who might be affected by the Project's marine construction activities.

*Construction Safety Zones.* The CSZs will be established in consultation with the FLC and will remain in place until 2010. The CSZ will be clearly marked with buoys. To reduce the impacts of construction on fishing activities, NLRC will allow as much use of the construction area as possible (within the constraints of safety) for normal fishing activities. For instance, once the Construction Dock/Tug Berth facility is operational, this portion of the CSZ will cease to be an exclusion zone and fishers will be permitted to fish in the area again.

*Timing of Activities.* NLRC will also consult with the FLC and other fishers concerning the best timing for intake and outfall construction activities. It is anticipated that intake and outfall installation operations would be scheduled during a three-month period when harvesting activities and spawning in those areas are at minimum levels.

*Fisheries Interference Compensation Program.* NLRC will establish a Fisheries Interference Compensation Program (FICP) to compensate fishers for actual economic loss due to the temporary exclusion of or interference with fish harvesting activities and lost fishing opportunity within the CSZ during construction. The principles and components of the FCIP will be similar to fisheries compensation programs that have been established for other marine construction projects in Atlantic Canada.

# <u>Gear Damage</u>

*Mutual Avoidance of Activities / Vessel Management*. The establishment of the CSZs will reduce likelihood of conflict. Communications (in both directions between fishers and Project) will be facilitated through the FLC and FLM.

*Control and Containment of Debris.* Appropriate precautions will be taken during construction to prevent the escape of debris from onshore and marine sites. The EPP will specifically include safeguards to eliminate such impacts.

*Fishing Gear and Vessel Damage Compensation Program.* NLRC will establish a Fishing Gear and Vessel Damage Compensation Program (FGVDCP) to cover any damage to fishing gear, equipment or vessel, resulting from an incident involving contact with any Project vessel or debris. The program will also cover catch lost directly as a result of the damage or loss.

The NLRC program will be similar to those currently operating within the Province's offshore area. The Program will provide fair and timely compensation to fishers who may sustain damage that occurs as a result of Project-related activities of NLRC, or its contractors.

# <u>Fish Scaring</u>

Selection of Equipment. Pile driving will be conducted using equipment suitable for depth and substrate type at the location. Every effort will be made to design a system and select equipment to minimize excessive noise in the marine environment. In general, such effects, if seen at all, would be expected to be short-lived and reversed fairly quickly.

*Construction Safety Zones.* Since the construction noise will be connected with activities within the CSZ, there will be a sound attenuation buffer between activities and active fishing.

*Timing.* As noted above, NLRC will consult with the FLC and other fishers concerning the best timing for intake and outfall construction activities, aiming at a period when harvesting activities in those areas are at minimum levels.

# Interference/Lost Opportunity

*Construction Safety Zones.* The CSZs will be established so as to 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.

*Timing.* As noted, work on the intake and outfall sites will be scheduled when harvesting activities in those areas are at minimum levels.

Vessel Traffic Management Plan. Prior to the start of marine construction activities, NLRC will consult with its FLC to discuss and agree an appropriate Vessel Traffic Management Plan (VTMP) for the safe and efficient operation of Project construction-related marine traffic and fishing vessel operations in the vicinity of the IPA, and in other areas of Placentia Bay where Project vessels might be operating during this phase.

The VTMP will document information about all fish harvesting operations and fishing vessel transit activities in the IPA and establish protocols and procedures to ensure that construction-related vessel traffic avoids or minimizes potential interference with established fishing operations.

NLRC's VTMP would 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.

#### Project Effects: Aquaculture

For the Aquaculture VEC, the only potential interaction anticipated is through constructionrelated debris and siltation escaping from the site and causing damage to aquaculture gear, infrastructure or water quality. Since there are no aquaculture sites within the IPA, no grounds will be occupied, and no vessel traffic will transit through the sites. The distance between Project construction activities and the closest aquaculture operation (approximately 25 km) will ensure that sound will not be an issue.

#### Gear Damage

Issues. If construction-related debris escapes from the site, it has the potential to cause damage to aquaculture gear or infrastructure.

#### Project Mitigations: Aquaculture

#### <u>Gear damage</u>

*Control and Containment of Debris.* Appropriate precautions will be taken during construction to prevent the escape of debris from onshore and marine sites.

*Fishing Gear and Vessel Damage Compensation Program.* As described above, NLRC will establish a Fishing Gear and Vessel Damage Compensation Program (FGVDCP). This will include aquaculture equipment and infrastructure, and the value of any harvest lost as a direct result of the damage.

#### Project Effects: Processing

Issues. Each of the factors discussed above for commercial fisheries has a potential to affect fish processors by reducing the amount of raw materials (fish harvest) available to processing plants. However, as described previously, for most plants none, or only a small part, of the raw material comes from the construction area.

#### Project Mitigations: Processing

None required beyond those applied to fish harvesting.

### 5.4.3 Residual Effects: Commercial Fisheries, Aquaculture and Processing

#### Summary Chart

Table 5.8	Socio-Economic Effects Assessment and Significance of Residual Effects
	(Construction - Marine)

Valued Envi	Valued Environmental Component: Commercial Fisheries												
	erse		As	Evalu ssess	iation ing E Effe	Crite nviro ects	ria foi nmen	r tal		ess			
Effect / Activity		Mitigation	Magnitude	Extent	Frequency	Duration	Reversibility	Confidence	Certainty	Mitigation Succ	Significance		
		Commercial Fishe	eries										
Lost fishing grounds (construction activity around Project site and related safety zones)	A	Design and location of marine components; FLC; FLM; CSZs; interference compensation	N	L	с	S	R	н	н	н	NS		
Gear damage (vessel traffic; debris)	A	CSZs / vessel management; debris containment; gear compensation	N	L	R	S	R	Н	М	Н	NS		
Fish scaring - reduced "catchability" (noise)	A	Design and location; CSZs; timing	N	L	R	S	R	н	L	н	NS		
Interference / lost opportunity (vessel traffic; deviation around construction zones)	A	CSZ; transport of materials. timing. VTMP	N	L	1	s	R	н	М	н	NS		
		Aquaculture											
Lost fishing grounds (construction activity around Project site and related safety zones)	Ν	None required	-	-	-	-	-	-	-	-	NS		
Gear damage (vessel traffic; debris)	A	Debris containment; gear compensation	N	L	R	S	R	н	L	н	NS		
Fish scaring - reduced "catchability" (noise)	N	None required	-	-	-	-	-	-	-	-	NS		
Interference / lost opportunity (vessel traffic; deviation around construction zones)	N	None required	-	-	-	-	-	-	-	-	NS		
		Processing											

Valued Environmental Component: Commercial Fisheries												
			Evaluation Criteria for Assessing Environmental Effects							ess		
Effect / Activity	<u>P</u> ositive or <u>A</u> dv	Mitigation	Magnitude	Extent	Frequency	Duration	Reversibility	Confidence	Certainty	Mitigation Succ	Significance	
Lost fishing grounds (construction activity around Project site and related safety zones)	N	None required	-	-	-	-	-	-	-	-	NS	
Gear damage (vessel traffic; debris)	Ν	None required	-	-	-	-	-	-	-	-	NS	
Fish scaring - reduced "catchability" (noise)	N	None required	-	-	-	-	-	-	-	-	NS	
Interference / lost opportunity (vessel traffic; deviation around construction zones)	N	None required	-	-	-	-	-	-	-	-	NS	

#### **Commercial Fisheries Assessment Summary**

#### Lost Fishing Grounds

With the described mitigations in place, the magnitude of the effects on the commercial fisheries of lost fishing grounds because of construction activity around the Project site and related safety zones would be negligible although there will be some closed area throughout the construction period. The overall effects will be not significant.

#### Gear Damage

With the described mitigations in place, the magnitude of the effects on the commercial fisheries of gear damage because of construction activity would be negligible and the frequency rare. The overall effects will be not significant.

#### Fish Scaring

Effects on catch rates, to the extent that economic impacts would occur, are not expected from sound generated by Project activities. Given this, and with mitigations in place, the magnitude of the effects on the commercial fisheries of construction noise would be negligible and the frequency intermittent.

#### Interference/Lost Opportunity

Construction activities will be continuous in some marine areas during the marine construction phase. However, with the various mitigations in place and additional planning and communications the magnitude of the effects on the commercial fisheries would be negligible.

# <u>Aquaculture</u>

With the described mitigations in place, the magnitude of the effects on aquaculture operators because of construction activity would be negligible and the frequency rare.

# <u>Processing</u>

The only way the Project could affect plant operations is through a negative effect on the fisheries. Since the assessments conducted for commercial fisheries concludes that impacts from construction on harvesting success will be not significant, the impacts on plants will also be not significant.

# 5.4.4 Operations Phase (Marine Terminal)

During the project's operational phase, permanent marine facilities (wharf, tug basin and jetty) will occupy an area 800 m long along the shoreline and extending out a distance of about 400 m from the shoreline just north of Come by Chance Point. This area is deemed to be the Operations Phase Marine Terminal (MT).

NLRC meetings with local fishers indicate that the MT area is fished primarily for lobster by seven or eight fishing enterprises. FFAW research indicates that quantities of other species – capelin, scallop, blackback flounder, lumpfish, herring and mackerel – are also occasionally harvested in the vicinity of the MT.

As a result of early consultation with area fishers, the marine facilities have been re-aligned from the original design to accommodate fishers' requests for continued access to an important cod fishing grounds.

Consultation with one of the very few sea urchin harvesters in the bay indicates that the MT is not a desirable location for this species because of the siltation from several rivers flowing into the nearshore area in the vicinity of Come by Chance Point. Established sea urchin harvesting activities (from November to March) in seabed areas close to shore in Holletts Cove would not be affected by the presence of the intake and outfall installations. These urchins are taken relatively close to shore in this cove in water depths of 10 m and less.

Other marine facilities include the intake and outfall pipes. When installed, the seawater intake pipe will extend out 985 m from the shoreline at Holletts Cove and the intake end will be at a depth of 18 m. The outfall will extend 405 m from the shoreline at Southern Head to a depth of about 15 m. These facilities will be partially trenched and buried, then will lie in the shallower tidal zone (up to 5 m contour) on the seabed along most of their route.

The effluents will be treated before being discharged into the marine environment. As shown in Volume 3, the zone of influence of the effluent discharge outfall is limited to less than 100 m radius from the outfall.

It is expected that there will be an average of 17 vessel movements a week associated with refinery operations. This includes inbound and outbound bulk crude oil and refined product tankers; there will be many additional movements by tug, pilot and support vessels.

When circumstances require, some tankers may need to hold at anchorages within the bay. However, these vessels will use existing anchorages and no new anchorage locations will be required for this project. The primary sites would be AA, BB, CC, DD (CHS Marine Chart 4839).

Placentia Bay is within the Placentia Bay Vessel Traffic Services (VTS) Zone, and all ships 20 metres or more in length are managed under Vessel Traffic Services Zones Regulations under the Canadian Shipping Act, as administered in the area by the Canadian Coast Guard (CCG). CCG maintains a Marine Communications and Traffic Services facility in Argentia, Placentia Bay. Participation in the Placentia Bay VTS system will be mandatory for all tankers arriving or departing from the Marine Terminal.

Placentia Bay also has an established Vessel Traffic Separation Scheme (VTSS). It extends from the southern limit of Placentia Bay to just north of Red Island. A two-way route exists for traffic between Red Island and the Head of Placentia Bay. Tankers approaching and departing from the Marine Terminal will use these traffic schemes at all times, unless an emergency situation requires them to do otherwise. Consultations with Transport Canada and the Canadian Coast Guard indicate that the VTSS has sufficient capacity to accommodate anticipated refinery-related traffic levels.

Mapping of current harvesting locations by fishers indicate that the VTSS lanes are frequently and successfully harvested by area fishers, particularly for snow crab. In discussion with NLRC and in a survey by FFAW for the Project, fishers indicate the traffic lanes (and traffic) has and is affecting their fishing activity.

The interaction matrix in Table 5.9 below identifies interactions between the fishing industry and the marine terminal during operations. While the design life of the Project is 25 years, it is expected that the facilities will operate for a much longer time period, with re-fit, upgrading, expansion as long as it remains economically viable.

Table 5.9	Interactions Matrix ·	Routine Activities,	<b>Operations Phase</b>
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Environmental Considerations		Project Activities	Valued Ecosystem Components			
Key to Interaction Rating:			Commercial Fisheries			
0 No interaction Y Potential interaction			Commercial	Aquaculture	Processing	
Effect	Pathway	Activity				
Lost fishing grounds	Permanent marine N	Marine terminal	у	0	у	
	facilities	Intake	у	0	у	
		Outfall	у	0	у	
		Anchorages	у	0	у	
Gear damage	Vessel traffic	Tugs and other support	у	0	у	
		Tankers	у	0	у	
Fish scaring (reduced "catchability")	Noise	Vessels	у	0	У	
Interference / lost opportunity	Vessel traffic / vessels;	Traffic lane	у	0	у	
	deviation	Local traffic				
		Anchorages	у	0	у	

#### Project Effects: Commercial Fish Harvesting

#### Lost Fishing Grounds

Issues. Fishing will not be possible on the grounds occupied by the new construction, and harvesting operations using heavy gear (e.g. scallop dredges) will not be permitted over the intake and outfall pipe routes in order to avoid damage to the facilities. Any vessels using heavy anchors would also be asked not to set their anchors in the general vicinity of these latter installations.

#### <u>Gear Damage</u>

Issues. Refinery shipping, including tugs and other support vessels could transit through and damage fixed fishing gear. (Mobile gear is not expected to be an issue as fishing vessels and Project vessels should be aware of each other.) This could have an adverse effect on commercial fisheries.

#### Fish Scaring

Issues. Concern that noise from Project-related shipping will scare finfish from harvesting areas and fishing gear. This would not be expected to be the case for benthic invertebrates including such as lobster and crab, as discussed in the Construction Phase assessment.

# Interference / Lost Opportunity

Issues. Tankers and bulk carrier vessels will enter and leave Placentia Bay via the designated traffic lanes (VTSS), assisted by tugs within the lanes and when docking at, or departing from, the Terminal area. Because of the presence of the permanent Marine Terminal facilities, some fishers will also have to deviate slightly when transiting the shoreline. Some of the tankers may occasionally transit to and hold at anchorages within the Bay.

## Mitigation

# Lost Fishing Grounds

*No Net Habitat Loss.* The Project's habitat "no net loss" program will enhance existing lobster and scallop habitat in portions of the MT area. NLRC will consult area fishers for advice regarding the most appropriate location for its habitat enhancement initiative.

*Design and Location of Permanent Marine Components.* As described in the assessment for the Construction Phase, Project plans were designed in consultations with fishing industry.

Use of Existing Anchorages. Existing anchorages will be used and no new sites created. Displacement effects from fishing grounds within designated anchorages will also be minimal because the jetty will have the capacity to handle several tankers at any one time, and the refinery will employ a "just in time" approach for the delivery of its crude oil supplies and finished product. Hence, loading and unloading delays will be at a minimum.

Access to Terminal Area. The amount of fishable seabed area lost to permanent project facilities will be kept to a minimum. Once the marine wharf is completed (expected late fall 2009), established lobster grounds around the marine wharf may be re-opened to fishing, possibly by the start of the following (2010) lobster season.

Intake/Outfall Restricted Area. Through its FLC (described below), NLRC will ensure that all fishers are fully aware of the location and routes of the intake and outflow installations where heavy fishing gear and anchors will not be permitted. Their end points will be marked with buoys at the surface.

*Fisheries Loss of Access (LOA) Compensation Program.* Prior to beginning refinery operations, NLRC and its FLC, in consultation with the FFAW, will establish a Fisheries LOA Compensation Program to compensate fishers for actual economic loss caused by the presence of permanent facilities on established fishing grounds within the Project's Marine Terminal area.

# <u>Gear Damage</u>

Avoidance / Vessel Management. NLRC will establish a voluntary traffic management scheme (VTMS) to manage vessel traffic to and from the Marine Terminal and to designate an appropriate route to be followed by all incoming and outgoing Project vessels. (See under Interference/Lost Opportunity.) This will be developed in consultation with fishing interests. Certainty about routing will allow fixed gear fishing in areas outside the traffic lanes with reduced likelihood of gear conflicts.

*Marine Terminal Gear Compensation Program.* NLRC will establish a program to compensate fishers who sustain gear damage or loss within portions of the Marine Terminal area where NLRC has agreed they may continue fishing.

*VTMS Gear and Vessel Damage Program.* NLRC will establish a VTMS area gear and vessel damage program to compensate any fisher that suffers gear damage or loss because a Project vessel did not follow the agreed VTMS route and operating procedures.

# Fish Scaring

None required. The containment of refinery vessel traffic within agreed routes away from fishing will reduce or eliminate the potential for overlap of activities.

## Interference/Lost Opportunity

*Fisheries Liaison Committee*. NLRC will establish a Fisheries Liaison Committee (FLC), prior to initiation of the Construction Phase, to facilitate and maintain ongoing consultations and communications with fisheries participants about vessel traffic and other marine issues. In addition to individual area fishers and aquaculture operators, the FLC would also include representatives of the FFAW.

*Fisheries Liaison Manager.* NLRC will employ the services of a full-time, dedicated Fisheries Liaison Manager (FLM) to develop, maintain and facilitate a close, ongoing working relationship between NLRC and all Placentia Bay fisheries participants during Project operations. A chief part of the Managers job will be to work with the Marine Traffic Manager (described below) to help minimize interference with fisheries activities.

*Use of VTSS and TSS.* All refinery-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 minimize the areas of potential interference. The locations of these lanes are well known to fish harvesters.

Anchorages. As discussed above, operational procedures (e.g. "just-in-time" product delivery procedures) and facilities design will allow minimum use of existing anchorage areas by Project vessels (tankers).

Voluntary Traffic Management Scheme (Entrance to Come by Chance Bay). NLRC will also establish and implement a Voluntary Traffic Management Scheme (VTMS) to manage project-related vessel traffic in the marine area between the north end of the existing designated VTSS and its marine facilities (wharf and jetty) at Come by Chance Point.

*Marine Traffic Manager.* NLRC's Marine Traffic Manager, in conjunction with the FLM, will oversee and manage interactions between project vessels and fishing vessel traffic operating in the refinery VTMS, and to maintain communications between NLRC marine operations and fishing vessel operators designed to minimize interactions and interference.

# Aquaculture: Commercial Fish Harvesting

Issues. Considering the location of activities vis a vis present aquaculture operations, no potential interactions are expected as a result of routine operation of the refinery. There are no aquaculture sites within the IPA or near routes to be used by refinery-related vessels. The closest aquaculture operation is approximately 25 km from the marine facilities.

# Processing: Commercial Fish Harvesting

Issues. As discussed in the Construction Phase assessment, while the factors discussed for commercial fisheries have some potential to affect fish processors by reducing the amount of raw materials (fish harvest) available to processing plants, as described in Section 5.3, for most plants none or only a small part of the harvest comes from the Marine Terminal area. Some of the raw materials utilized by fish processing plants come from the Project's area of operations, e.g. crab harvested in the VTSS area. Project vessel activities in the VTSS would not affect crab harvesting levels in that zone.

# Mitigations: Commercial Fish Harvesting

None required beyond those applied to fish harvesting.

### 5.4.5 Residual Effects Operations: Commercial Fisheries, Aquaculture and Processing

#### Summary Chart

#### Table 5.10 Socio-Economic Effects Assessment and Significance of Residual Effects (Operations - Marine)

Valued Environmental Component: Commercial Fisheries												
	erse		Eva	luatior Envi	n Crite ronme	ria for ntal Ef	Asses ffects	sing		ess		
Effect / Activity	Positive or Adv	Mitigation	Magnitude	Extent	Frequency	Duration	Reversibility	Confidence	Certainty	Mitigation Succ	Significance	
Wild Fisheries												
Lost fishing grounds (permanent marine facilities)	A	No net habitat loss; design and location of components (inc. use of existing anchorages); access to terminal area; information communications about restricted areas; fisheries LOA compensation.	Ν	L	С	L	R	н	н	н	NS	
Gear damage (vessel traffic)	A	Avoidance / vessel management. marine terminal and VTMS compensation programs	N	L	R	L	R	н	L	н	NS	
Fish scaring - reduced "catchability" (noise from vessel operations)	А	None required (vessels will stay in routes)	N	L	R	L	R	н	L	н	NS	
Interference / lost opportunity (vessel traffic; incl. Traffic lanes)	A	FLC; FLM; use of VTS and TSS; VTMS (Entrance to Come by Chance Bay); Marine Traffic Manager	N	L	с	L	R	н	Μ	Н	NS	

#### Lost Fishing Grounds

Assessment. With the described mitigations in place, the magnitude of the effects on the commercial fisheries of lost fishing grounds because of the presence of the permanent Project facilities would be negligible though there will be some permanent loss of former grounds. The overall effects will be not significant. Details of the factors of this assessment are provided in Table 5.10.

#### <u>Gear Damage</u>

Assessment. With the described mitigations in place, the magnitude of the effects on the commercial fisheries of gear damage because of operational activity would be negligible and the frequency rare. The overall effects will be not significant.

#### Fish Scaring

Assessment. The noise from ships associated with operations are not expected to be different from those usually associated with other vessels in the bay, such as fishing boats and other marine industries. Research studies have not documented any measurable reductions in fishing success due to vessel noise.

Given this, the magnitude of the effects on the commercial fisheries of construction noise would be negligible and the frequency intermittent. The overall effects will be not significant.

#### Interference/Lost Opportunity

Assessment. Construction activities will be continuous in some marine areas during the marine operations phase. However, with the various mitigations in place and additional planning and communications the magnitude of the effects on the commercial fisheries would be negligible. The overall effects will be not significant.

#### Aquaculture

Assessment. Considering the lack of potential interactions, the magnitude of the effects on aquaculture operators because of routine refinery operations would be negligible and the overall effects will be not significant.

#### Processing

Assessment. The only way the operation of the refinery's marine facilities could affect fish processing operations is through a negative effect on the fisheries. Since the assessments conducted for commercial fisheries conclude that impacts from operations on harvesting success will be not significant, the impacts on plants will also be not significant.

### 5.4.6 Accidental Events: Oil Spill

Accidental events (specifically, oil spills or other accidental hydrocarbon releases into the marine environment) may affect the various components of the commercial fisheries VEC in Placentia Bay in very different ways. However, for each of commercial fish harvesters, aquaculturalists and fish processors, the effects relate generally to loss of access to the resource, lost opportunity, increased operating expenses, damage to gear and equipment, and potential market impacts.

Both the type and level of impacts will depend on the many variables involved in any actual spill event. These include:

- The location of the spill whether the point of release occurs at the Marine Terminal jetty, at an anchorage, or at any specific location along the route of the VTSS within Placentia Bay. For instance, a release near the mouth of the bay will affect different commercial resources and economic interests than one in the northern part of the bay, or from the Marine Terminal.
- The source of the release whether from the refinery or from a tanker.
- The type of hydrocarbon released whether crude or refined products
- The size of the spill: more than any other single factor, this would determine the extent of the effects on the range of fisheries VECs in Placentia Bay.
- The time of year as fisheries vary in terms of location, species and gear.
- The weather at the time of the spill and during countermeasures
- Success of initial mitigative efforts effectiveness, duration and completeness of atsea or shoreline clean-up efforts. This includes how quickly the oil can be contained, the spill "footprint" that results, and whether it can be kept from reaching shore.
- The characteristics of the areas affected.

Depending on the level and extent of the shoreline impacted, the greatest effects (on a perenterprise basis) may be felt by the aquaculture sector. For a spill that is retained or cleaned up at sea, the commercial fisheries would be more likely to be affected. Under any scenario, the fish processing sector would likely be the least affected since much of its raw materials come from waters beyond Placentia Bay.

Even without actual resource damage (i.e. to the fish stocks), economic impacts might nevertheless occur if a spill resulted in a negative effect on the marketability of fish products or lower prices based on market perception. It would only be possible to quantify such effects by monitoring the market situation after a spill occurred.

Exactly when a spill might occur over the life of the Project would also be a very important factor in its economic consequences. If the spill were to occur, for instance, twenty or thirty years in the future, the species of interest, seasons and conservation measures in place might be very different. Currently underutilized species may have new and lucrative markets. The aquaculture sector may have expanded into many new areas with many new species in production.

Considering that any actual spill event will involve some unique combination of all of these factors and variables, it is not useful, or possible, to predict with any level of confidence what the actual economic consequences might be. These costs can only be known after the fact, when all the claims have been received and economic damage has been assessed.

The following sections consider the potential and differential economic impacts on fish harvesters, aquaculture operators and processors in more detail.

#### Effects

#### Commercial Fish Harvesting

The chief effect that would be expected on most fishing activity, particularly in areas beyond the coastline, would result from temporary loss of access to certain marine areas (i.e. closed or "off limits" zones) because of the presence of spilled oil or spill clean-up activities.

The effects would be largely dependent on whether the closed area coincided with active fishing grounds, and whether or not there were alternative harvesting locations available. For instance, as the harvesting location maps indicate, for some species, such as snow crab, lumpfish or sea urchins, fishing can occur throughout large parts of the bay or along extensive coastal areas. As such, unless the spill was very large, there might be adequate alternative grounds available.

Such closures would likely continue as long as a slick persisted, or while there were measurable hydrocarbons in the water. The extent of the economic impact would also be affected by the time the spill occurred within the fishing season, and where the fisher was in terms of harvesting his/her quota (in quota fisheries, such as snow crab). Depending on the duration and persistence of a spill, a substantial portion of the fishing season might be lost, or only a small part.

Even if the spill did not prevent access to a particular area, there might be an economic effect if the spill increased the time it took fishers to go around an affected zone in order to reach their fishing grounds. The same delays might result from having to fish on alternative fishing grounds. These activities might result in increased costs and decreased fishing efficiency, and/or lost opportunity to pursue other fisheries.

If inshore or shoreline areas of Placentia Bay were involved, the lobster fishery and the bar seine herring fishery might be affected for a relatively longer time, until the oil was cleaned up. The same would be the case for squid and mackerel fisheries, as indicated by the location of important grounds on the harvesting maps. Capelin and blackback flounder harvesting areas, which are focused on the eastern side of the bottom of the bay nearer the refinery location would also be vulnerable.

Costs related to gear cleaning or replacement might also be incurred, particularly for fixed gear, as well as for vessels and coastal infrastructure, e.g., wharves.

As noted above, economic effects might also result if market confidence is lost. If there were a perception in the marketplace after a spill that fish from the area were of an inferior quality, lower prices could result or buyers could be lost, even in the absence of actual physical effects. Such perceptions might be hard to overcome, and could persist long after the spill. These economic effects are difficult to predict, since the actual (physical) impacts of the spill might have little to do with the consequential economic effects resulting from negative market.

# <u>Aquaculture</u>

Most of the causes and economic effects for fisheries would also apply to fish farming. The chief difference is that – if a spill reached an aquaculture site – there would be no alternative area, and the spill would likely shut down the entire operation. The operation's gear and equipment would likely be oiled, including shore facilities such as docks and holding facilities.

Market perceptions and buyer impacts might be more significant for an aquaculture operation (or for the entire aquaculture production area perceived to be affected) than a fishery, since fish farming operations are associated strongly with a specific geographical location. In certain situations, e.g. hydrocarbons from a spill becoming incorporated into nearshore and inter-tidal sediments, an aquaculture operation might have to abandon its location and re-establish elsewhere at a substantial cost (expenses as well as lost time and opportunity).

# <u>Fish Processing</u>

Impacts on fish plants (whether processing wild or farmed fish) are most likely to be economic as to operational (e.g. water intake affected by oil contamination) and result from effect on the supply of raw material (fish) that the plant processes rather than the spill's proximity to the processing facility.

The types of economic effects in these cases would be direct loss of income from sales and potentially loss of buyers. There might also be an impact on market confidence in the processor's ability to ensure continuity of supply. Plant workers would likely be laid off in these cases.

# **Mitigation**

The best mitigation in the case of oil spill is prevention. Strict regulations and international standards must be implemented by the shipping companies. Adequate emergency response capabilities and close working relationships with all stakeholders must be in place.

Any such economic effects described above (such as those caused by loss of access, gear damage, stock damage, increased expenses or changes in marketability or market value) could

be considered significant to commercial fisheries and aquaculture operators. However, the availability and use of economic compensation would reduce the potential impact to not significant.

There are several international conventions that provide for compensation for oil spill related costs and damage resulting from a tanker spill. Canada participates in these as well as providing an additional source of compensation for ship-sourced oil pollution (Table 5.11).

Tier	Compensation Available
Tier 1	Establishes, through the 1992 Civil Liability Convention, a strict liability regime for the shipowner for damage caused by persistent oil, subject to specific limits based on the tonnage of the ship. The maximum compensation available is \$180 million or 90 million SDRs for the largest ship.
Tier 2	The International Oil Pollution Compensation Fund has a maximum limit of \$405 million or 203 million SDRs, inclusive of any amount payable by the shipowner under Tier I.
Tier 3	Canada's SSOPF, which has an additional \$140 million available for claims that occur in Canada and that exceed Tier I/II compensation. The SSOPF also pays Canada's contribution to the IOPC Fund.
Total	Approximately \$545 Million per incident

 Table 5.11
 Tiered Compensation for Oil Spills in Canadian Waters.

A specific source of compensation and clean-up costs for spills of persistent oils (crude oil and heavy refined products) from tankers is the International Oil Pollution Compensation Fund.

It consists of two main components, the 1992 Civil Liability Convention, which governs the liability of shipowners for oil pollution damage, and the 1992 Fund Convention, which supplements the 1992 Civil Liability Convention. The former sets out the principle of strict liability for shipowners and creates a system of compulsory liability insurance; the latter establishes a regime for compensating affected parties when the compensation under the applicable Civil Liability Convention is inadequate.

Liability under the Civil Liability Convention is structured as follows (amounts in 2007 US dollars):

- for a ship not exceeding 5,000 units of gross tonnage, US \$7 million;
- for a ship with a tonnage between 5,000 and 140,000 units of tonnage, US \$7 million plus US\$954 for each additional unit of tonnage; and
- for a ship of 140,000 units of tonnage or over, US \$136 million.

The 1992 Fund Convention, which provides supplementary payment if the Civil Liability funds are not adequate, offers a further US\$ 307 million. In addition, for claims that occur in Canada and exceed the other two funds allowance, the Ship-Source Oil Pollution Fund can provide up to an additional \$ 140 million.

Economic losses in the fisheries sector include loss of earnings by owners of property contaminated by oil (consequential loss), for example oiled fishing gear. There is also compensation for pure economic loss.

The basic principles of these programs aim at compensating fisheries participants in a fair and timely manner for all actual loss with the intention of leaving them in no worse or better position than before the losses occurred. These principles will be important components of NLRC's policy and response in the event that a spill occurs and results in economic consequences for fish harvesters, aquaculture operators or processors. This will ensure that any actual loss to the fisheries industry resulting from any oil spill is fully and adequately addressed.

#### 5.4.7 Monitoring and Follow-Up

Monitoring and follow up of the effectiveness of day to day practical implementation of mitigation measures will be the responsibility of the Fisheries Liaison Manager (FLM). The FLM would provide regular reports to NLRC at site and to the Fisheries Liaison Committee. It is anticipated that the FLM would participate in the Placentia Bay Traffic Committee. It is also anticipated that direct communication would continue between NLRC and the FFAW Placentia Bay Sub-committee and that both of these groups would participate on the Placentia Bay Traffic Committee.

NLRC will ensure that information about their plans and activities will be provided to the Placentia Bay Integrated Planning Committee and will be available to work with this forum. This forum may be the most effective in ensuring communication with aquaculture activities.

NLRC also intends to have a multi-faceted environmental effects monitoring program in place which will include sampling fish and shellfish to ensure the refinery operations do not affect quality. In the event of a spill, NLRC will implement a pre-planned sampling program in collaboration with DFO and the refinery Fisheries Liaison Committee.

It is expected that DFO's regulation based monitoring will continue and statistics, such as those used in this assessment will continue to be available for monitoring purposes.

# 6.0 HEALTH AND COMMUNITY SERVICES

An important aspect of the understanding of the environment in which the Project would take place is the health and well-being of Study Area residents. The Health Research Unit (HRU) was contracted to prepare a community health profile.

The HRU took a holistic view of the request and addressed not only the standard indicators of illness and mortality but also the determinants of health as defined by the Public Health Agency Canada, 2003. As such, the profile includes information on demographics, social infrastructure (health and social services availability, access, satisfaction), employment and income, and lifestyle, addressing physical and mental health.

# 6.1 Community Health Profile

The study area for the profile included communities within a 50 km radius, Clarenville, the bottom of the Bonavista Peninsula, the area immediately adjacent to the proposed refinery site on the Burin Peninsula, and Random Island. This approximates the area included in the NLRC air quality study and provides for a larger statistical basis for the analysis. The Study Area's information is compared to the rest of the Eastern Health region, the province and Canada.

The full report has been provided as a background document to the Environmental Assessment and is available at council offices and the Project Information Centre. The key points are summarized in this section.

#### 6.1.1 Determinants of Health

The availability of health and social resources in a community is one of the "determinants of health" for that community. The availability and capacity of health care and social support agencies, infrastructure and services are described later in this Section.

Age distribution of the population is also a determinant of health: data indicate that the area population is slightly older than other areas considered.

Employment and income (and income adequacy) are also key determinants of health. Table 6.1 shows the employment status for the area in comparison with the rest of the Eastern Health region and the rest of the island portion of the province. The area has the highest unemployment rate for young people ages 15 to 24 years, and for the age group 25 years and older, the rate of unemployment is three times that for Canada (Table 6.2). However, the area also has the highest percentage of self-employment, fewer households were in the two lowest levels of income adequacy, and a greater percentage of the residents had diplomas or certificates in trades.

Location	Study Area	Eastern Health	Island Portion of Province
		dents	
Self-employed	8.0	6.0	5.6
Employed by company/organization	37.8	41.5	38.7
Not employed for pay	25.5	25.1	28.0
Retired	21.5	20.7	21.5
Student	7.3	6.6	6.2
Total sampled	278	3,957	7,932

#### Table 6.1Employment Status

Source:

Newfoundland Adult and Community Health Survey, 2001, Newfoundland and Labrador Statistics Agency

Location	Study Area	Eastern Health	Province	Canada					
	Unemployment Rate (%), both Sexes								
Age 15-24	37.1	29.0	33.1	13.7					
Age 25+	17.3	15.1	19.9	6.2					

Table 6.2Unemployment Rate (%), both sexes

Source:

Statistics Canada, Table 95F0495XCB01001-NFLDLAB-TNL: Profile for Canada, Provinces, Territories, Census Divisions and Census Subdivisions, 2001 Census.

#### 6.1.2 Self Reported Health Status

Personal health practices influence the health status of the individual and the community. The data from the area indicate that the incidences of smoking and drinking alcohol were slightly lower than the other areas of the province but that the level of exercise was also lower, resulting in a higher occurrence of high Body Mass Index (overweight).

Health status can be measured by a number of indicators including self-reported health or emotional status, number or types of chronic conditions and level of disability. The HRU report also includes satisfaction with medical care, daily levels of stress and financial circumstances as all these can have an effect on a person's reported health and well being.

In general, over 63 percent of area residents rated their physical health as either "excellent" or "very good". Area residents were less satisfied with their level of medical care than other areas. Chronic conditions most frequently reported include arthritis and rheumatism, recurring backaches, allergies, and high blood pressure at levels comparable to other areas. Allergies are less frequent.

Over 90 per cent of area residents indicated their mental health as "excellent" or "good." One of the major stressors in daily life is coping with finances and a higher percentage of area residents (compared to the other areas of the Island) reported that they felt "very good" or "good" about their finances and that they were either "better off" or "about the same" relative to five years earlier. (Note: these data are from a 2001 survey as the most recent information.)

### 6.1.3 Illness and Mortality

Morbidity (acute care hospital separation) and mortality (death) rates are indicators of the general health of a population.

The top two major cases of death in the area, Eastern Health region, the province and Canada, were diseases of the circulatory system and cancer.

Mortality rates were similar across the areas being compared with a few exceptions: females had the lowest mortality rate for cancers or diseases of the respiratory or nervous system, but the highest for diseases of the endocrine, nutritional, metabolic and immune systems; males had the lowest mortality rate for diseases of the endocrine, nutritional, metabolic and immune systems (Table 6.3).

Location	Study Area		Eastern Health		Province		Canada	
Sex	Μ	F	М	F	М	F	Μ	F
Infectious & Parasitic Diseases	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
All Malignant Neoplasms	2.7	1.6	2.6	2.0	2.6	1.9	2.2	1.9
Endocrine, Nutritional, Metabolic & Immune	0.2	0.6	0.4	0.4	0.4	0.5	0.3	0.3
Diseases of the Nervous System	0.3	0.2	0.4	0.5	0.3	0.4	0.3	0.4
Diseases of the Circulatory System	3.3	2.6	3.3	3.0	3.3	2.9	2.5	2.4
Diseases of the Respiratory System	0.6	0.3	0.7	0.5	0.7	0.5	0.6	0.6
Diseases of the Digestive System	0.1	0.3	0.2	0.2	0.2	0.2	0.3	0.3
Disease of the Genitourinary System	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1
Injury and Poisoning	0.4	0.1	0.4	0.2	0.5	0.2	0.6	0.3

 Table 6.3
 Cause Specific Death Rates, All Ages, 1999-2003 (Deaths/1,000 Population)

Sources:

Statistics Canada, Annual Mortality File, 1999-2003 Statistics Canada, Canadian Vital Statistics, Death Database, 2000-2003 Statistics Canada, Causes of Death, Shelf Tables, 1999 Population Estimates for Census Subdivisions (based on 2001 Census), Statistics Canada Statistics Canada, Demography Division, 2001

Morbidity is based on hospitalizations for various causes, including clinical data collected on all acute and surgical daycare patients. The HRU report centred on acute care – a focus of the EIS Guidelines. The top three causes of hospitalization (excluding pregnancy and childbirth) for all areas were diseases of the circulatory, digestive and respiratory systems (Table 6.4). The incidence of hospitalization (for all causes) was lowest for the Study Area residents.

 Table 6.4
 Acute Care Hospital Separations by Cause, 1999-2000 – 2003-2004<sup>1</sup>

Area of Residence	rea of Residence Study Area		Easter	n RIHA	Prov	/ince	Canada <sup>2</sup>		
Sex	м	F	м	F	м	F	Μ	F	
Infectious & Parasitic Diseases	58.5	69.7	129.5	127.4	126.0	126.2	147	145	
All Malignant Neoplasms	377.7	375.7	583.8	517.7	622.9	535.7	563	537	

Area of Residence	Study	y Area	Easter	n RIHA	Prov	/ince	Can	ada <sup>2</sup>
Sex	М	F	Μ	F	Μ	F	Μ	F
Endocrine, Nutritional, Metabolic Diseases and Immunity Disorders	107.2	166.7	287.1	307.7	293.7	334.8	190	231
Diseases of Blood and Blood-Forming Organs	85.3	92.1	110.6	137.9	123.6	140.5	74	89
Mental Disorders	177.9	181.6	643.2	579.9	643.0	613.7	496	574
Diseases of the Nervous System and Sense Organs	112.1	104.5	173.6	174.9	203.0	209.2	188	201
Diseases of the Circulatory System	1464.6	995.3	1831.0	1342.8	1996.4	1484.9	1656	1249
Diseases of the Respiratory System	584.9	522.5	1074.3	928.9	1215.9	1049.4	884	780
Diseases of the Digestive System	757.9	719.1	1082.8	1194.0	1238.1	1417.8	1016	1070
Diseases of the Genitourinary System	202.3	507.6	385.9	927.9	474.1	1000.4	397	743
Diseases of the Skin and Subcutaneous Tissue	56.0	67.2	120.4	115.9	144.7	134.8	107	95
Diseases of the Musculoskeletal System and Connective Tissue	292.4	236.4	356.0	364.4	406.7	420.2	389	449
Congenital Anomalies	56.0	27.4	63.8	40.7	69.0	46.4	57	44
Injury and Poisoning (nature)	382.6	303.6	708.4	632.0	830.7	706.4	835	744
Pregnancy and Childbirth	0	1,109.7	0	2,210.6	0	2,202.7	0	2,555

Source:

Clinical Database Management System 1999/00 to 2003/04; Canadian rates are from the Canadian Institute for Health Information online report Hospital Morbidity Tabular Reports 2000-2001 available at http://secure.cihi.ca/cihiweb/products/Hospital Morbidity TabularReports2000-2001.pdf

1 Based on the most responsible diagnosis. (Separations per 100,000 Population. Five-year average)

2 Rates are for fiscal year 2000-01

#### 6.1.4 Health and Air Quality

Certain diseases of the respiratory system are more likely to be aggravated by emissions from refineries. Those of particular concern are Chronic Obstructive Pulmonary Disease (COPD) and asthma. Table 6.5 shows that over the years 1999 to 2004 the Study Area had lower rates of hospitalization for COPD and asthma than Eastern Health region, the province or Canada. Rates for bronchitis and emphysema (a subgroup within COPD) in the area show similar values for males, but lower for females, when compared to Eastern Health region, the province or Canada.

# Table 6.5Acute Care Hospital Separations for Diseases of the Respiratory System, 1999-<br/>2000 – 2003-041

Area of Residence	Study Area		Eastern RIHA		Province		Canada <sup>2</sup>	
Sex	М	F	м	F	М	F	М	F
All Respiratory Diseases	584.9	522.5	1074.3	928.9	1215.9	1049.4	884	780

Area of Residence Study Area		Eastern RIHA		Province		Canada <sup>2</sup>		
Sex	М	F	М	F	М	F	Μ	F
Chronic Obstructive	160.8	129.4	295.1	233.7	336.9	237.6	288	275
Pulmonary								
Disease (COPD)								
Bronchitis and Emphysema	21.9	5.0	20.3	19.4	26.7	25.3	111	102
Asthma	43.9	77.1	84.9	110.7	98.3	110.2	98	103
Other respiratory	404.5	350.8	728.7	634.3	823.2	747.9	595	505

Source:

Clinical Database Management System 1999-2000 to 2003-04; Canadian rates are from the Canadian Institute for Health Information online report *Hospital Morbidity Tabular Reports 2000-2001* available at http://secure.cihi.ca/cihiweb/products/HospitalMorbidityTabularReports2000-2001.pdf

<sup>1</sup> Based on the most responsible diagnosis (Separations per 100,000 Population. Five-year average)

### <sup>2</sup> Rates are for fiscal year 2000-01

It is known that certain refinery emissions can be a health concern. The emissions of particular interest for the proposed refinery are: sulphur dioxide, nitrogen oxides, volatile organic compounds, particulate matter, and carbon monoxide. As a group they are referred to as "criteria air contaminants" and on their release into the atmosphere, where they react with other pollutants, they can cause smog and acid rain.

#### Health Canada states that:

"The elderly, people with existing respiratory and cardiovascular problems, and children are particularly vulnerable. Health effects caused by air pollutants may range from subtle physiological changes to difficulty breathing, wheezing, coughing, and aggravation of existing respiratory and cardiac conditions. These effects can result in increased medication use, increased doctor or emergency room visits, more hospital admissions and even premature death. Children are often at increased risk from exposure to toxic substances because they are not fully developed and can be more susceptible to injury. Greater air intake relative to body weight, compared with adults, also increases a child's potential for excessive exposure to air pollution." (Health Canada, 2007)

Sulphur and nitrogen dioxides, along with their transformation products on reaction with elements in the air, can cause or exacerbate diseases of the respiratory system such as chronic obstructive pulmonary disease (COPD) and asthma. Studies have shown that exposure to poor air quality, particularly when combined with exercise, may aggravate COPD or asthma and lead to an increase in the number of emergency room visits and hospitalizations for these diseases.

Cardiac diseases can also be exacerbated by pollution, directly or indirectly by the worsening of other systems, e.g., respiratory diseases.

Many volatile organic compounds (VOCs) are suspected of having toxic effects on people. Benzene has been suggested as a possible problematic VOC for the proposed refinery. It is known to be a carcinogenic compound.

Our analysis of the data available for the chosen time frame shows that self-reported asthma was slightly increased in both the Eastern Health region and the province, but allergies (of any kind) were slightly reduced (Table 6.5) compared to the Study Area. Hospitalizations for COPD and asthma were lower in the Study Area than in either the Eastern Health region or the province.

Given the association between emissions and cardiac and respiratory diseases, morbidity and mortality data for these diseases should be monitored, particularly for children and older residents in the area. Caution should be exercised in the collection and reporting of these data because of the small numbers involved, and all rate calculations should be averaged over several years.

# 6.1.5 HRU Report Conclusions

Overall, for most indicators included in this report, the study area did not show any large discrepancies when compared to the Eastern Health region and the province. However, the area was marginally older, which might account for it being slightly better off financially; it had fewer smokers, lower stress levels, and fewer hospitalizations for mental disorders. On the other hand, the area had a higher rate of unemployment in the 15-24 age group and more adults who had not completed high school certification. It also had more adults above the recommended BMI value and more reporting a non-active lifestyle.

The variation in hospitalization rates between the area and the other areas was considerable in some cases, but it must be remembered that the population was relatively small (16,000) and minor deviations in the number of hospitalizations for any cause can make a noticeable difference in rates when quoted for a 100,000 population catchment, as is the convention.

Since conditions reported here are those that prevailed at the time of the reviewed studies, changes in the population may affect the current health status of the residents in the area.

When the refinery is built and in operation it will be important to monitor the health status of the local population, particularly in relation to health problems that may either develop or be exacerbated by refinery emissions. These are known to affect those with existing respiratory and cardiovascular problems and those who spend more of their time outdoors – either for work or leisure.

# 6.1.6 Human Health Risk Assessment

Through the work done for NLRC by the Health Research Unit at Memorial University, a baseline health profile of communities in the project area has been established (HRU, June

2007 in the Socio-economic Component Study). As well, in consultation with the Department of Environment and Conservation, NLRC has modelled the dispersion of air emissions from the proposed new crude oil refinery at Southern Head. While the dispersion modelling showed that all emissions are below, even well below, regulated limits, NLRC has also undertaken a human health risk assessment for the area through SENES Consultants Limited.

The human health assessment is an evaluation of the potential health effects from the substances emitted to the air from the refinery on people who may use the adjacent area for recreational purposes and residents in the nearby communities. No pathways of potential exposure other than air have been identified.

The evaluation is based on the fact that Southern Head is a greenfield site, although there is considerable industrial infrastructure nearby in this area of Placentia Bay. The proposed refinery will consist of process facilities, a marine terminal, storage tanks and an access road and utilities. The primary product of the proposed refinery will be gasoline, kerosene / jet fuel, ultra-low sulphur diesel and refining by-products.

# Methodology

The methodology used in assessing human health risks followed guidelines outlined by various regulatory agencies including Environment Canada, Health Canada, the Canadian Council of Ministers of the Environment (CCME), and the United States Environmental Protection Agency. Results are expressed in terms of hazard quotients and cancer risk levels. The hazard quotient is defined as the ratio of exposure to a toxicity reference value. In general, regulatory agencies concur that a hazard quotient below 0.2 for the air exposure pathway or an incremental cancer risk level equal to or less than one-in-a-million (<1 x 10-6), is not significant. Risk levels below these regulatory limits were interpreted as reflecting no significant adverse health effect.

The possibility of short-term (1 hour) health outcomes was assessed based on exposures that would occur from predicted air concentrations of gaseous air pollutants at the maximum concentration location off the site (including the property boundary). The potential for health effects from longer term exposure (8 hour and 24 hour and annual) was assessed at the nearby communities. Cautious estimates (i.e. likely over-estimates) of exposure were used in the assessment to ensure that risks were not underestimated.

The chemicals of concern identified were gaseous air pollutants (carbon monoxide, nitrogen oxides and sulphur dioxide), volatile organic compounds (VOCs), petroleum hydrocarbon (PHC), polycyclic aromatic hydrocarbons (PAHs), and particulate matter. ( A description of these chemicals is provided in Volume 3 Biophysical Assessment, Section 3.2 Air Quality.)

The pathways considered included exposure through inhalation and ingestion of chemical offsite through direct deposition to vegetation or deposition into the soil and uptake by vegetation, such as berries. Effects on two sets of receptors were considered: recreational site users, and residential receptors. Both sets of receptors included adults and toddlers and the residents set also considered infants. The communities included in the assessment were Arnold's Cove, Come By Chance, North Harbour, Sunnyside and Southern Harbour.

The pathways considered are shown below:

- Inhalation of Air: The emissions from the proposed refinery will result in the direct exposure of the human population as the plume impinges down onto the ground level. Human receptors will therefore inhale both gaseous and particle-borne chemicals while outdoors. For the residential receptor it was assumed that the indoor environment was the same as the outdoor.
- Inhalation of Soils and Dusts: Human exposure may occur through inhalation of soils and dusts outdoors as the gaseous and particle-borne chemicals emitted from the proposed refinery are deposited onto soils and surfaces. The rate of this deposition is a function of the local meteorological conditions such as wind speed and precipitation rates.
- Ingestion of Soil: Chemicals emitted from the proposed refinery can be deposited on soil and can be ingested by human receptors outdoors during playing and gardening activities. The toddler receptor is generally the most exposed receptor since they ingest the most amount of soil.
- Ingestion of Locally Grown Vegetation: As chemicals emitted from the proposed refinery are deposited from air-borne emissions, they may contact leaves and fruit of locally grown (backyard gardens) vegetation, where they may remain on the surface or may be absorbed into the plant. Based on information collected in Ontario (MOE 2001), approximately 7.5 % of the vegetable intake of an Ontario resident is from backyard gardens. As discussed, this was considered conservative based upon a literature available. Deposition of chemicals onto the soil may also result in accumulation in plants via root uptake. Humans are exposed to these chemicals by eating the produce from their backyard gardens.
- Ingestion of Locally Grown Berries: Similar to the locally grown vegetables, chemicals emitted from the proposed refinery are deposited from air-borne emissions, they may contact leaves and fruit of wild berries, where they may remain on the surface or may be absorbed into the plant. It was conservatively assumed that 100% of the daily ingestion of berries is from the adjacent site for the recreational / visitor. Deposition of chemicals onto the soil may also result in accumulation in plants via root uptake. Humans are exposed to these chemicals by eating the produce from their backyard gardens.
- Ingestion of Breast Milk: It is assumed that infants may be present in residences around the proposed refinery and would therefore be exposed to chemicals via the breast milk of their mothers. It is assumed that mothers are exposed to the COC via the consumption of locally grown vegetation as well as the inhalation of air, soils and dust. This exposure pathway was only assessed for COC with a log octanol-water partition coefficient (log Kow) greater than 3, which are generally considered lipophilic. PAHs fall into this category and are assessed at the various communities surrounding the proposed refinery.
- Dermal Exposure to Soils and Dusts: Dermal exposure by receptors may occur through direct dermal contact with air-borne chemicals and/or soil and dust on which chemicals have been deposited. In this assessment the incremental soil

concentrations were so low that his pathway would be insignificant and thus, is not assessed further.

## Short-term Effects

The short term health effects related to gaseous air pollutants were compared to established health-based values from the World Health Organization that were derived based on immediate effects on respiratory health. The short-term (e.g., respiratory health effects) and long-term health risk associated with exposure to the gaseous air pollutants was assessed based on using a hazard quotient value of 1 since background exposures were taken into account.

Based on the conservative nature of the emission estimates, the expected limited exposure to elevated short-term conditions and the protective nature of the Toxicity Reference Value (TRV), it is expected that the potential for a human health effect from short-term exposure is considered to be low. However, the short-term maximum concentration off-site for NO<sub>2</sub> and SO<sub>2</sub> is above the health based criteria at some locations over water and will be further assessed during future modeling for the site.

# Long-term Effects

The chronic exposure to  $NO_2$ , CO and  $PM_{2.5}$  are well below health-based guidelines and therefore not expected to be a concern.

SO<sub>2</sub> concentrations are expected to remain below the WHO interim guideline and be similar those recently experienced in this area.

The cancer risk values for long-term exposure to carcinogenic chemicals, VOCs and PAHs are all below the negligible risk level of one-in-a-hundred thousand (1 x 10-5).

Additionally, hazard quotients for non-carcinogenic chemicals (predicted exposure dose, chronic toxicity reference value) associated with the non-carcinogenic chemicals, VOCs, PHCs and PAHs are all well below 0.2. Therefore, it was concluded that no measurable adverse health effects would be expected to occur in the vicinity of the proposed refinery.

# Conclusion

In summary, exposure to contaminants such as PAHs and VOCs that would be released from the proposed refinery are not expected to have an adverse effect on people that may use the neighbouring area for recreational purposes or reside in the nearby communities.

Predicted concentrations of gaseous air pollutants and particulate matter from the proposed refinery will incrementally add to existing air quality levels. However, the increment will be small, or of limited duration and extent and will, with the exception of SO<sub>2</sub>, be generally within the natural variation of existing levels. Therefore, it is not expected that any additional measurable health effects will be experienced in the area.

Based on levels of SO<sub>2</sub> already existing in the communities, there is a potential for health effects from exposure to SO<sub>2</sub>. However, the HRU health status review of the community did not reveal any significant differences in respiratory ailments (these are the endpoint of concern for SO<sub>2</sub> exposure)from other populations, and, while the NLRC would add to the SO<sub>2</sub>, it is not expected that there would be a significant change in the health in the communities. However, NLRC will monitor not only air quality but specific health effects as part of it effects monitoring program. As well, it is expected that when the actual equipment for the refinery is selected using best available technology that the emissions will decrease, including potentially SO<sub>2</sub>.

The risks have been deliberately over-estimated as a result of the assumptions made about exposure (which were generally cautious) and used in this assessment. The overall conclusion of the assessment is that there will be no incremental measurable adverse effects on the humans from the operation of the proposed refinery.

# 6.2 Infrastructure and Services

# 6.2.1 Existing Environment

## **Overview of Capacity**

The largest of the four Regional Integrated Health Authorities responsible for health care in the Province, Eastern Health services communities from St. John's to Port Blandford, including all communities in the Study Area. Eastern Health services a population of more than 290,000 and employs over 12,000 health care and support workers (Eastern Health, 2007). There are a number of health care facilities in the area including one hospital in Clarenville, several health care centres and other facilities. Within the Study Area there are a total of 91 acute care beds, 8 critical care beds, 185 long-term care beds and 9 holding beds.

Two recent community health needs assessment studies have been undertaken in the region: one on the Burin Peninsula and the other on the Southern Avalon (Eastern Health, 2006 and 2007). The Burin Peninsula study was based on 2004 figures. At that time, the Burin Peninsula had 63.3 specialists per 100,000 people compared with the Province's rate of 71 and the Canada average of 91. Burin had 75.9 general practitioners per 100,000 people compared with the Province's rate of 121 and the Canadian average of 98. The Southern Avalon had 73.82 general practitioners per 100,000 people compared with the provincial and national averages of 99 and 97 respectively (2006 data). Occupancy levels at medical care facilities increased slightly from 2002-2005 to 87% for medicine/surgery, 42% for obstetrics/gynecology and 46% for intensive care. Thus, the Study Area has fewer specialists and general practitioners than the provincial and national average, but capacity exists to treat new patients.

Nurse/patient and physician/patient ratios are other measures of capacity. The Health Canada Annual Report 2005-2006 indicates that there are 1.9 physicians for every 1,000 people in Newfoundland and Labrador, which compares favourably with 2.1 per 1,000 nationally. This is

due, in part, to the number of doctors located in urban areas such as St. John's. A recently released socio-economic study in the region indicates that a high nurse/population ratio (1:215) and an even higher physician/population ratio (1:4,508 maximum in a range) exist and suggests that general practitioners or family doctors may be most impacted by in-migration of large project workers (Jacques Whitford Limited, 2007).

Many job opportunities are available for heath care workers (mainly for nurses and physicians) in the region.

As is the case throughout the Province, it is becoming increasingly difficult to attract medical professionals to the rural areas of this Province and as the population grows older and increasingly declines due to out-migration and a lower birthrate, this situation will become exacerbated. For example, despite a declining population in the Study Area, the current acute care providers are operating at full capacity, in part because they are dealing with an older population and their attendant needs. However, it is also becoming increasingly challenging to attract acute care givers to rural populations. that lack the funding, medical, social and cultural facilities and staff to retain them.

# Public Health and Acute Care Systems

# Hospitals in Project Area

Eastern Health serves communities from St. John's to Port Blandford, including all communities in the Study Area. Eastern Health services a population of more than 290,000 and employs over 12,000 health care and support workers (Eastern Health, 2007).

The Dr. G. B. Cross Memorial Hospital in Clarenville, which serves the Study Area, has 47 acute care beds, 14 long-term care beds (Sunshine Manor) and two respite care beds. Construction has begun on a new 44-bed long-term care facility with a planned opening date of 2008 (H. LeDrew, pers. comm.). Services include: anesthesia, chemotherapy, diabetes education, family practice, general surgery, gynecology, ICU/cardiac, internal medicine, laboratory, long-term care, mammography, nursing, rehabilitation, CT services, nutritional services, obstetrics, occupational therapy, palliative care, pastoral care, pathology, pediatrics, pharmacy, phototherapy, psychiatry, physiotherapy, pedology, recreation therapy, respiratory therapy, social work, speech language pathology, ultrasonography, visiting specialty clinics and 24-hour emergency services. The full complement for the hospital is 22 doctors, although currently they have 17.

# Community Health Centres

The Dr. William H. Newhook Community Health Centre is located in Whitbourne and is used as a teaching facility for Memorial University's Faculty of Medicine. The facility maintains three observation/holding beds and a full range of services including diagnostic, environmental, outreach programs, visiting disciplines in audiology, dietetics, and occupational therapy, and 24-hour emergency services. The facility does not admit patients, transferring them to St. John's if needed.

The Placentia Health Centre maintains 10 acute care beds, 75 nursing home beds, two respite care beds and 40 independent living units. This facility also offers a full range of services including in-patient and out-patient medical care. Routine laboratory and radiology services are available on-site. Allied health services, such as clinical nutrition, occupational therapy, physiotherapy, speech language pathology, respiratory therapy and social work are shared with Lions Manor Nursing Home and other sites (Eastern Health 2007). In Marystown, the Burin Health Care Centre offers acute care services in family practice, 24-hour emergency services, general surgery, obstetrics, pediatrics, psychiatry, gynecology, ICU, internal medicine, chemotherapy, diabetes education, physiotherapy, phototherapy, occupational therapy, speech language pathology, stress testing, EKG, nutritional services, clinical dietetics, palliative care, pharmacy, social work, respiratory therapy, nursing, pastoral care and visiting specialty clinics. There are 42 beds in the facility with 16 doctors on staff and approximately 85 nurses (T. Keating, pers. comm.).

# Public Health Nurses

Other communities in the Study Area have community health offices and residents must travel to the larger health care centres for treatment. Public health nurses working at community health offices provide a number of services including continuing care, home care, public health nursing, and international travel health clinics. Public health nurses in Clarenville and Come By Chance are busy and there is a request through the Federal "Basket of Services" program for an additional three nurses in this area to provide home and therapeutic services so that hospital stays are shortened and to reduce hospital admittance (J. Pickett, pers. comm.).

# Health Care Facilities in St. John's

St. John's has some of the largest hospitals in the province (General Hospital and Janeway Children's Health and Rehabilitation Centre at the Health Sciences Centre, St. Clare's Mercy Hospital, the Waterford Hospital and the L. A. Miller Centre) providing a mix of tertiary and secondary care services. Depending on the nature of the illness or accident, these hospitals are equipped or have access to almost any type of specialists and major equipment. The Janeway operates 53 acute care and 25 critical care beds, the General Hospital has 312 acute care and 32 critical care beds, while St. Clare's has 188 acute care and 16 critical care beds (Eastern Health, 2007). There are also numerous specialist centres such as the Dr. H. Bliss Murphy Cancer Centre, the L. A. Miller Centre for long-term treatment and the Waterford Hospital for individuals with mental health issues.

International health services are provided through international travel clinics at Community Health Care offices. There are private travel clinics in St. John's (Jacques Whitford, 2007). Clinics offer services in travel health counselling, immunizations and disease testing and are located at community health offices in Burin, Come By Chance, Clarenville, Holyrood, Placentia and Whitbourne (Eastern Health, 2007).

# Community and Family Social Services

Community and family social services are offered in the Study Area by Eastern Health, addressing issues such as family violence, addictions, youth protection, child welfare, persons with disabilities, mental health issues, seniors issues, and persons with special needs. Service delivery in the Study Area is summarized in Table 6.6.

Table 6.6 Co	ommunity Services, Progra	ams and Capacity in th	ne Study Area
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Service	Location Offered	Service Details
Health	Clarenville	Heart health e.g. active living, smoking and healthy eating
Promotion and	Holyrood	Substance abuse prevention
Protection	Whitbourne	Mental health promotion
		Reproductive health
		Parent and child health
Community	Bay Roberts	Support health promotion and protection programs, school
Health Nursing	Burin	aged children and adult immunizations, and Communicable
	Clarenville	Disease Control and follow-up
	Come By Chance	
	Holyrood	
	Placentia	
	Whitbourne	
Mental Health	Clarenville, Placentia and	Treatment/intervention, mental health promotion, partnerships
Services	Marystown	with other service providers (RCMP, hospitals, schools, etc.).
		I here are 90 acute care and 131 tertiary care beds in Eastern
Addictions	Bay Roberts (1 staff)	Alcohol, drug and gampling prevention and treatment
Services	Burin/Marystown (1 staff)	ricenel, and gambing prevention and realment
	Clarenville (2 staff)	
	Holyrood (1 staff)	
	Whitbourne (1 staff)	
Community	All Study Area Communities (on-	Placement and assessment for seniors, people with physical
Support Program	line intake form or through	disabilities, personal care homes, long-term care facilities;
	offices)	Home support
		Special assistance programs
		Facility based respite
		Kenabilitation services
		Alternate Family Care Home Program
		Reterrals for the Provincial Home Repair Program

Service	Location Offered	Service Details		
Child Care and Intervention	Not listed	Child care services (licensing, monitoring and support of licensed child care options in the region);		
Gervices		based behavioural support and training program;		
		Direct Home Services Program is a family centered, home based, early intervention program with a focus on child outcomes		
Child, Youth and Family Services	Bay Roberts Burin/Marystown Clarenville Holyrood Placentia Whitbourne	Child, Youth and Family Services (CYFS) program responds to referrals of child maltreatment, assess risk and provide protective intervention services; The Adoptions program; The Community Corrections Program		

## Wellness Coalitions

Eastern Health supports the work of two wellness coalitions, one of which, the Eastern Regional Wellness Coalition, is active in the Study Area. This organization of community, government and non-government groups and agencies promotes wellness, improved health and well-being through the following programs: healthy eating, physical activity, tobacco control, injury prevention, mental health promotion, child and youth development, environmental health, and health protection.

#### Provincial Income Support and Employment Services Program

An income support program provided through the provincial Department of Human Resources, Labour and Employment offers income support for eligible individuals and families to meet basic needs such as food, clothing and shelter. Services are provided through four provincial districts. The Study Area lies within the Avalon and Central Districts and offices are located in Placentia, Marystown and Clarenville.

The Placentia office is in the Avalon District; it has a service focus on employment services and has one client service officer and an administrative assistant. A career development Specialist travels to the Placentia office from Harbour Grace to provide career-counselling services. The office serves approximately 300 cases per year and has 30-40 longer term, active cases at any given time.

Delivery of income support services in the Central District has changed since November 2006. Clarenville's office employs 12 staff members (all full-time), and processes approximately 400 applications per month. They also provide career, employment and youth services from this office.

In Marystown, the office provides work income supplements for the entire province as of November 2006. This service provides extra income for basic needs for clients who have some

work (part-time, casual) and require assistance. The office employs 17 client service officers and has handled approximately 800 clients since November 2006, with potential increases expected due to changing over of the work income supplement services to this location from other offices, by August 2007. Career, employment and youth services are provided from this office as well as the fisheries adjustment strategy to deal with fish plant closures in the region (R. Turner, pers. comm.). Information on income and employment insurance rates is provided in Section 4.1.

# Federal Income Support and Employment Counselling Services

Service Canada, operated by Human Resources and Social Development Canada, offers federal income support services including employment insurance (EI) benefits. The provincial income support program and Service Canada work in combination to provide range of income support, employment and career-counselling services for individuals, organizations and businesses. Service Canada offices are located in Clarenville, Marystown and Placentia and can also be accessed by telephone or by Internet. Services include:

- **Individual Services:** Identification cards (pleasure craft licensing; passport office receiving agent) and training and learning (apprenticeship incentive grant)
- **Organization services:** Partnership initiatives and funding programs
- **Business services:** Human resources management (hiring foreign workers; record of employment; wage subsidies) and labour market information.

# 6.2.2 Project Effects

The Project will have some effects on the Study Area's health and community services and other social services administered by provincial agencies but these are expected to be at a minimum largely due to the fact that the service systems are designed and resourced, with some limited exceptions, to deal with a larger population base. If, and when, the demand for these services increases it is expected that the public agencies concerned will seek the additional resources from the provincial government.

# Public Health and Acute Care Systems

The Project has the potential to directly impact the health care system with an influx of workers, particularly during construction when pre-service medicals will be required. Project-related accidents could put some stresses on the system in both the short-term and over the long-term. Potential indirect effects are felt through relocation of families into the area who will require access to a full range of acute, primary, public health and other paramedical services in the region.

#### Community and Family Social Services

There are positive and negative effects associated with the Project. A positive effect will be increased employment in the Study Area. On the other hand, in some cases, increased incomes result in dysfunctional spending patterns (e.g., alcohol, drugs and gambling) that could place pressures on family, community and health system resources. Overall, an increase in population in the Study Area will lead to some additional demand on community and family social services.

#### 6.2.3 Mitigation Measures

#### Public Health and Acute Care Systems

The NLRC holds the health and safety of its employees as one of its key core values, and to mitigate adverse effects on the health care system, the company will:

- Prepare and implement a Health, Safety and Environmental Management System (HSEMS) to prevent the need for emergency health services;
- Employ on-site medical practitioners at the Project site and the work camp;
- Encourage pre-employment medicals to be conducted in the employee's home community, rather than in the Study Area;
- Consider conducting pre-service medicals on the Project site; and
- Advise Eastern Health about the recruitment schedule well in advance.

#### **Community and Family Social Services**

To help increase the positive effect of increased wages and family stability, NLRC will:

- Encourage those individuals currently working away from home to return for competitive wages, benefits and long-term employment (Operations);
- Offer a positive work environment and a corporate culture that supports family life and enhances quality of life in the community; and
- Lead the development of a regional industry-community service agency committee that will discuss common issues and collaborate on initiatives that will enhance or mitigate issues.

To help mitigate any negative social effects, NLRC will:

- Implement employee assistance programs;
- Refer employees to existing social services programs offered in the region;
- Implement a Health, Safety and Environmental Management System which will promote healthy living practices and prevention – lessening the need to seek these services in the community; and
- Share Project plans with local social service agencies regarding the anticipated number of employees and families re-locating or returning to the Study Area so that they are able to plan service provision accordingly.
#### 6.2.4 Residual Effects

#### Summary Chart

Table 6.7 provides a summary of the residual effects.

Table 6.7	Residual Effects on Public Health and Acute Care S	Systems & Community and Family Service	es
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Social Services VEC	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Level of Confidence	Certainty	Mitigation Or Enhancement Success	Significance
Public Health and Acute Care Systems (Construction)	Adverse	Low	Regional	Short to Medium-Term	Continuous	Yes	Medium	Medium	Moderate	Moderate
Public Health and Acute Care Systems (Operations)	Adverse	Low	Regional	Short to Medium-Term	Continuous	Yes	Medium	Medium	Moderate	Moderate
Community and Family Social Services (Construction)	Adverse	Low	Regional	Short to Medium-Term	Continuous	Yes	Medium	Medium	Moderate	Moderate
Community and Family Social Services (Operations)	Neutral	Low	Regional	Short-Term	Continuous	Yes	Medium	Medium	High	Moderate

## Construction

#### Public Health and Acute Care Systems

Project effects on the health care system will be primarily addressed through the preparation and implementation of the mitigation measures discussed above. However, because of the number of workers in the area, there could be some short-term stresses on the health care system until Eastern Health can respond.

The residual project effect on health care is therefore considered adverse since it places more stress on an already overburdened system, is low in magnitude, is regional and short-to-medium term. Frequency of the effect is continuous until it can be mitigated through increases in staff and service capacities. The effect is reversible, and the level of confidence in this assessment is medium, with a medium certainty of occurrence. The mitigation success is considered moderately effective since certain types of health care for an increased population of workers and their families will not be provided by NLRC. The significance of the effect is moderate.

## Community and Family Social Services

Many of the project effects can be mitigated through the measures described above; however, an increase in population in the Study Area will mean that more services are required. This effect lessens over time as the construction period wanes. The residual effect on social services is therefore adverse, low, and is regional in geographic extent. Duration of the effect is short-medium term, and the frequency is continuous. The effect is reversible, and the level of confidence in this assessment is medium, with certainty of the effect also being medium. The mitigation and enhancement success are moderately effective and the significance of the effect is moderate.

## **Operations**

## Public Health and Acute Care Systems

Project effects on the health care system will be primarily addressed through the preparation and implementation of the mitigation measures discussed previously. However, because of the number of workers in the area, there could be some short-term stresses on the health care system until Eastern Health can respond. The indirect effect of a few families moving into the area will occur over a longer period of time and, while this could pose a short-term negative effect it will likely be mitigated over time through planning for health care system growth.

The residual project effect on health care is therefore considered adverse since it places more stress on the system, is low in magnitude, is regional, and short – medium term. Frequency of the effect is continuous until it can be mitigated through increases in staff and service

capacities. The effect is reversible, and the level of confidence in this assessment is medium, with a medium certainty of occurrence. The mitigation success is considered moderately effective since certain types of health care for an increased population of workers and their families will not be provided by NLRC. The significance of the effect is moderate.

#### Community and Family Social Services

Many of the Project effects can be mitigated through the measures described previously; however, an increase in population in the Study Area will mean that more services are required. This effect lessens over time as operations workers settle into the communities and social services providers assess needs and implement plans to respond to these needs. With steady employment and income as well as more stable communities as a result of the Project, some of the stresses on the community and family services system will decrease. The residual effect on social services is therefore neutral, low, and is regional in geographic extent. Duration of the effect is short-term, and the frequency is continuous. The effect is reversible, and the level of confidence in this assessment is medium, with certainty of the effect also being medium. The mitigation and enhancement success are effective and the significance of the effect is moderate.

#### Monitoring and Follow-Up

NLRC will implement a monitoring and follow-up program as described below.

## Public Health and Acute Care Systems

In coordination with Eastern Health, NLRC will monitor for any increased demand for services that are directly attributable to the Project.

#### **Community and Family Social Services**

In coordination with Eastern Health, NLRC will monitor for any increased demand for services.

# 7.0 HOUSING

## 7.1 Existing Environment

#### 7.1.1 Housing Stock

Table 7.1 shows data for occupied private dwellings in the Study Area including the total number of dwellings, owned and rented dwellings, average value of dwellings and average gross monthly rents. The data show trends from the 1996 and 2001 Census data. Census 2006 housing data was not available.

Only Clarenville had an increase in the number of occupied dwellings in this period. The decrease in occupied dwellings was greatest in the other three larger centres, Marystown, Placentia and Arnold's Cove. In all cases the number of dwellings owned was more than the number rented. The number of owned dwellings increased in Arnold's Cove, Clarenville and Come By Chance but decreased in all other Study Area communities. Rentals increased in Clarenville in Garden Cove, North Harbour and Swift Current but dropped in all other Study Area communities. Average housing values rose in all Study Area communities with the exception of Placentia.

Community	Total # of Occupied Dwellings		Owned Dwellings		Rented Dwellings		Average Value (\$)		Ave Gross Monthly Rent (\$)	
	1996	2001	1996	2001	1996	2001	1996	2001	1996	2001
Arnold's Cove	385	355	310	315	75	40	52,762	64,848	444	374
Clarenville	1,850	1,895	1,240	1,245	610	650	85,717	96,714	494	506
Come By Chance	95	95	80	85	15	10	51,871	48,946	534	
Div 2, Subd K (Garden Cove, North Harbour and Swift Current)	265	265	255	240	10	20	40,790	44,842	135	477
Div 1, Subd A (Goobies, Sunnyside, Southern Harbour, Little Harbour East)	325	305	295	285	25	20	46,227	54,061		293
Marystown	2,125	2,075	1,505	1,495	615	585	68,572	71,766	508	474
Placentia	1,675	1,625	1,320	1,275	360	345	91,418	54,161	447	442
Study Area	6,720	6,615	5,005	4,940	1,710	1,670	62,480	62,191	427	367

Table 7.1 Occupied Private Dwelling Characteristics

Community	Total # of Occupied Dwellings		Owned Dwellings		Rented Dwellings		Average Value (\$)		Ave Gross Monthly Rent (\$)	
Province	185,500	189,040	143,060	147,750	42,360	41,170	70,835	76,283	497	513

Source:

Statistics Canada 1996, 2001

Newfoundland and Labrador Community Accounts

#### 7.1.2 Housing Market Activity

Provincially, a drop of 9 per cent in housing starts occurred in the year 2006-2007. In this period, a 59 percent decline in single-detached housing starts occurred and an increase of 64 percent in all other housing types (CMHC, 2007). Housing starts, sales and average selling prices in the Study Area from 2002 to 2006 are shown in the Socio-Economic Component Study, Newfoundland and Labrador Refinery Project. Clarenville, Marystown and, to a lesser extent, Arnold's Cove, are the only communities in the Study Area where residential construction activity has been recently occurring (R. Dalton, pers. comm.). Two new subdivisions are being constructed in Clarenville, with a third planned to begin in the spring of 2007. Lots with 60-70 foot frontage in Clarenville are selling for \$40,000 - \$45,000. Selling prices range from \$8,000 in Southern Harbour (2004) to \$115,000 in Clarenville (2006). Housing prices in the communities of the Study Area have not increased during the past year. Housing sale activities in the Study Area are low as owners appear to be taking a "wait and see" approach regarding the Project. During construction of Hibernia some people bought houses in nearby communities so that they could benefit from rising house prices while others moved to secondary (cottages) homes so they could rent their primary residences during construction periods. Housing prices in Clarenville are comparable to those available in St. John's.

## 7.1.3 Rental and Low-Income Accommodations

Rental rates in the Study Area are detailed in the Socio-Economic Component Study, Newfoundland and Labrador Refinery Project, that accompanies this report. Apartments are available in Marystown and Placentia. The Canada Mortgage and Housing Corporation does not keep statistics on rental rates for communities in the Study Area.

Low-income housing in the Study Area is provided by Newfoundland and Labrador Housing Corporation (NLHC). Currently, 29 low income rental units exist in Clarenville, one in Shoal Harbour, nine in Arnold's Cove, four in Goobies, one in Sunnyside and two in Come By Chance most occupied by long-term tenants. Rent is based on income levels, ranging from 25-30 percent of tenant income (N. Feltham, pers. comm.).

NLHC also has rental units in five communities on the Burin Peninsula: St. Lawrence, Fortune, Grand Bank, Burin and Marystown. There are 319 units with 110 current vacancies. In the

region, NLHC operates three seniors' cottage complexes (totalling 26 units) and finances three additional seniors' homes (totaling 24 units). The cottages operate at 100 per cent capacity and rent is based on 30 per cent of net family income.

In Placentia, NLHC has 55 rental units. No vacancies exist; however, two units are available further south (outside Study Area) (S. Rockwell, pers. comm.).

## 7.1.4 Temporary Accommodations

Temporary accommodations include hotels, bed and breakfasts, work camps, boarding houses, shelter and campsites. The Study Area contains seven hotels with 335 rooms, 19 B&Bs with 60 to 75 rooms, three resorts, two boarding houses with eight rooms, and over 350 campsites. There are no shelters for the homeless in the Study Area (A. Cook, pers. comm.); one women's shelter is located in Marystown. There are four privately run personal care homes in the Study Area – two in Clarenville, one in Arnold's Cove and one in Marystown. More detailed information on accommodations is provided in the Socio-Economic Component Study, Newfoundland and Labrador Refinery Project.

Occupancy rates for the Study Area were provided by the Department of Tourism, Culture & Recreation (Figure 7.1 and Figure 7.2). Figure 7.1 shows that occupancies in the Study Area increase in the summer peak months (June – September) to a maximum of 67 per cent. The data also show that occupancy rates are higher for the Southern Head communities in the peak period compared to Placentia and Marystown. In the off-peak periods, Placentia has the lowest occupancy rates, followed by Marystown and Southern Head.



## Figure 7.1 Occupancy Rates for Primary Study Area by Month in 2006

Source: Newfoundland and Labrador, Department of Tourism, Culture & Recreation; AMEC Interpretation

Figure 3.2 shows overall occupancy in peak periods (June – September) for 2003 – 2006. The data show a steady decline in overall occupancy in the peak period for Southern Head communities between 2003 and 2006; an increase in Marystown between 2003 and 2005 with a drop in 2006 that may be attributed to lower reporting rates for 2006. Peak period occupancies have remained steady in Placentia, with a slight increase in 2006.



Figure 7.2 Overall Occupancy Rates for Peak Period (2003 – 2006)

Notes:

Peak Period is June - September

Source: Newfoundland and Labrador, Department of Tourism, Culture & Recreation; AMEC Interpretation

## Roadside Camping

The EIS Guidelines require that the Proponent address roadside camping: during the initial work at the Bull Arm site, some site workers set up temporary roadside 'residences' such as campers or trailers. There are no laws against camping on crown land in the province and nothing can be legally done to prevent it. However, the Department of Transportation and Works has the right to remove any vehicles, including campers, that obstruct general road maintenance and/or interferes with public safety.

## 7.2 Project Effects

The Project has the potential to affect housing in the Study Area by:

• Increasing demand for temporary and permanent housing, which has a positive effect on the housing industry and increases the municipal tax base, but a negative effect if housing availability cannot meet demands in the short term, leading to illegal camping; and

• Increasing costs for housing which has a positive effect on the real estate industry but a potentially negative effect in increasing property taxes for existing residents.

During a recent major fabrication project at Bull Arm (for the Terra Nova Project), a workforce of 1,500 was accommodated without the use of a workcamp, through a combination of local housing and commuting.

## 7.3 Mitigation Measures

These effects will be mitigated and enhanced by NLRC through the following measures:

- Accommodate approximately half of the construction workforce (1,500 workers) at the Bull Arm work camp; the rest will likely commute;
- Encourage union agreement incentives to stay at the work camp and commute to the work site;
- Continue to compile and maintain a database of available housing and accommodations and ensure it is provided to all potential workers;
- Publicize housing demand and supply so that the cost of housing is not unnecessarily increased and housing and real estate industries can respond appropriately;
- Encourage workers to commute to the Project site from the Study Area during construction or move into the Study Area during operations);
- Support RCMP enforcement of illegal camping and squatting in local communities by advising all workers; and
- Consult with municipalities about project plans and schedules for accommodation needs.

## 7.4 Residual Effects

Table 6.8 provides a summary of the residual effects on housing and accommodations.

## 7.4.1 Construction

Overall negative Project effects during construction can be mitigated through encouraging work camp use and commuting. The residual effects are therefore characterized as positive, high, local and long-term. The effect is continuous throughout the construction phase, is reversible since the work camp can be decommissioned following construction if not required for Project maintenance shut-downs. The levels of confidence in and certainty of this assessment are high, with moderately effective enhancement success, i.e., there will be a measurable change in housing supply and demand but no permanent negative effect (effects will lessen as people become absorbed into the communities). Significance of the effect will be moderate.

## 7.4.2 Operations

The residual effects of the project are characterized as positive, high, local and long-term because people will have confidence in the economy and buy, build or renovate houses. The

effect is continuous throughout the life of the project, which is reversible since people can sell their house during decommissioning. The level of confidence in and certainty of this assessment is high, with moderately effective enhancement success, i.e., there will be a measurable change in housing supply and demand but no permanent negative effect (effects will lessen as people become absorbed into the communities). Since housing starts are a key indicator of an economy, significance of this effect will be moderate.

## 7.5 Monitoring and Follow-Up

NLRC will consult with their employees, municipalities, NLHC, CMHC and local builders and landlords regarding the status of housing supply and housing-related issues.

Social Services VEC	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Level of Confidence	Certainty	Mittgation Or Enhancement Success	Significance
Housing and Accommodation (Construction)	Positive	High	Local	Long-Term	Continuous	Yes	High	High	Moderate	Moderate
Housing and Accommodation (Operations)	Positive	High	Local	Long-Term	Continuous	Yes	High	High	Moderate	Moderate

 Table 7.2
 Residual Effects on Housing and Accommodation

# 8.0 EDUCATION AND TRAINING

## 8.1 Existing Environment

The Eastern School District administers the primary, elementary and secondary education system in the Study Area. It is the largest of the five school boards in the province, and manages 122 schools with approximately 44,000 students and 3,000 teaching and support staff.

## 8.1.1 Childcare Centres

As of 2003, nine childcare centres were located in the eastern region (excluding the St. John's CMA) with a total enrolment of 224, averaging 25 per establishment (Auditor General's Report, 2003). In the Study Area four licensed childcare centres exist: one each in Placentia and Marystown, and two in Clarenville (Health and Community Services, 2007).

Childcare centre capacity in Placentia is 16 children. Currently, 26 children are registered at the centre on a part-time basis (half attend in the morning and the other half in the afternoon) with two staff members (Jacques Whitford, 2007). In Clarenville, Early Discoveries Preschool / Daycare has capacity for 19 children with two teachers. Currently 7-12 students register daily (C. Pike, pers. comm.). Toddlers Corner Daycare in Clarenville has capacity for 23 children, with three teachers; 18 or 19 children attend. (L. Peddle, pers. comm.). In Marystown, Explore and Discover Childcare Centre has capacity for 57 children and six or seven teachers. The centre is operating at capacity (A. Murphy, pers. comm.).

## 8.1.2 Primary, Elementary and Secondary Schools

The data compiled for the fourteen schools in the Study Area for the years 2001 to 2007 show a slight, steady decline in enrolment with the exception of the schools in Clarenville that show relatively stable enrolments (Refer to data in Socio-Economic Component Study, Newfoundland and Labrador Refinery Project).

With respect to school capacities in the Employment Catchment Area, the data show that, without exception, capacity exists for more students in each school in the Study Area. Cumulatively, additional capacity exists for 2,533 students in Study Area communities. As is the case throughout the province, with a substantial decrease in school enrolment due to outmigration and declining birth rate, a rationalization of schools has occurred and will continue to occur. This is also true for the Study Area.

## Student/Teacher Ratios

Student/teacher ratios are available for economic zones within the province and are depicted in Table 8.1. Zone 15 (Discovery Regional Development Zone) encompasses the north end of

Placentia Bay including Clarenville, Zone 16 (Schooner Regional Development Corporation) encompasses the Burin Peninsula and Zone 18 (Avalon Gateway Regional Economic Development Inc.) encompasses the Avalon Peninsula. Although teacher allocations are closely tied to student enrolment, the number of students per teacher declined between 1997 and 2006 in all economic zones and shows a consistent trend compared to the provincial average (Table 8.1).

Economic Zone	Student/Teacher Ratio by School Year											
	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06			
15	14.3	13.9	13.6	13.1	12.6	12.8	12.7	12.6	13.1			
16	14.5	14.4	13.9	13.5	12.4	12.7	12.9	12.6	12.9			
18	15.4	14.7	14.6	13.8	13.0	12.8	13.0	12.5	12.0			
Provincial Average	15.1	15.0	14.7	14.2	13.6	13.9	13.7	13.9	14.1			

 Table 8.1
 Student/Teacher Ratio by School Year

Future plans for schools in Placentia include the closure of St. Edward's School in June 2009. Renovations will be made to St. Anne's Academy, which will become a K-6 school for Placentia/Dunville area and a new grade 7-L4 school will be constructed. This school will replace Laval High School and will open no earlier than September 2009 (S. Dale, pers. comm.). Voisey's Bay Nickel Company (VBNC) is contributing funds for school construction. The new high school will provide courses in skilled trades, home economics and computer science, and will have a gymnasium, a fitness centre, a library and a challenging needs suite (Newfoundland and Labrador Department of Natural Resources, 2006 in Jacques Whitford, 2007).

Clarenville Primary School will close in the near future when an extension is built on Clarenville Middle School. Balbo Elementary School will be reconfigured to a K-3 school for the entire feeder system and Clarenville Middle School (with extension) will be a grade 4-8 school for the entire feeder system (S. Dale, pers. comm.).

In Marystown, Pearce Junior High will close in June 2009 and Donald C. Jamieson Academy will become a grade K-8 school for the students in the Salt Pond area. Marystown Central High will become a grade 8-L4 school (S. Dale, pers. comm.).

## 8.1.3 Post Secondary Education Institutions

Within the province there is one university, Memorial University of Newfoundland (MUN); one public college, College of the North Atlantic (CNA), and 32 private training institutions (Department of Education, 2007). CNA Campuses within the Employment Catchment Area are located in Burin, Clarenville, Placentia, Seal Cove and St. John's. Keyin Tech is located in Clarenville and Marystown. A more detailed description about CNA and training in the Study

Area are contained in the Socio-Economic Component Study, Newfoundland and Labrador Refinery Project.

MUN is the largest university in Atlantic Canada. It operates two campuses in St. John's, one in Corner Brook, one in Saint-Pierre and one in Harlow, England. There are no MUN campuses in the Study Area; however, many of the residents attend the university completing programs including science, arts, engineering, business, education, nursing, pharmacy and medicine.

Enrolment at the university has increased during the past 10 years, with a current student population of over 17,500. The largest area of student population growth has been in graduate studies (Jacques Whitford, 2007).

The following sections focus on relevant programs offered by Memorial University, CNA campuses closest to the Project and by relevant private colleges.

 MUN offers several programs that are specifically related to the oil and gas sector. These include engineering (bachelor's, master's and PhD levels), business (bachelor's and master's levels), oil and gas studies (master's level), and several science programs (bachelor's, master's and PhD levels). While the focus of the engineering faculty has been previously on offshore and oil gas, the new programs in process engineering and offshore safety are particularly relevant to oil refinery related work and research.

MUN has made significant contributions to the oil and gas sector in the area of applied research with the PanAtlantic Petroleum Systems Consortium (PPSC) and the Centre for Marine Compressed Natural Gas (MUN, 2007). MUN is also home to several Canadian Research Chairs, and places an emphasis on subjects such as petroleum geoscience/geotechnology, environmental science, natural resource sustainability and community development and petroleum reservoir engineering and characterization (MUN, 2007).

Table 8.2 shows Memorial's capacity specifically related to the oil and gas sector.

Туре						
Faculty	50 including 19 new faculty and several research chairs					
Facilities	Harsh Environment Bridge Simulator – Marine Institute					
	Centre for Marine Compressed Natural Gas					
	Landmark Graphics Visualization Laboratory					
	Schlumberger Data Centre					
	Inco Innovation Centre – mining and oil and gas focus					
Programs	Advanced Diploma in Engineering					
	Masters and PhD in Engineering					
	Bachelors in Process Engineering					
	Masters and PhD in Process Engineering					
	Diploma in Marine Safety					
	Diploma in Remotely Operated Vehicles					
Executive MBA	Oil and Gas					
	Maritime Management					
Research foci	Offshore Safety					
	Underwater Vehicles					
	Engineering of Production Systems					
Students	100+ in oil and gas operations					

# Table 8.2Memorial University of Newfoundland's Oil and Gas Related Programs,<br/>Faculties and Facilities

 CNA is one of the largest post-secondary educational and skills training centres in Atlantic Canada and the only public college in the province, offering nearly 100 fulltime and 300 part-time programs to approximately 20,000 students each year. Programs include academics, applied arts, business studies, health sciences, engineering technology, industrial trades, information technology and tourism and natural resources. Enrolment at the college has increased by 100 people each year since 2001 (D. Hanrahan, pers. comm.).

Within the larger Employment Catchment Area, CNA has campuses in Clarenville, Placentia, Bonavista, Burin, Carbonear, Seal Cove and St. John's. Details on the programs offered at these facilities is presented in the Socio-Economic Component Study, Newfoundland and Labrador Refinery Project.

Typically, when CNA delivers training in core skill trades such as a millwright, scaffolder, machinist, welder, pipefitter, etc., courses run at full capacity. Facilities would not be able to absorb any increases in demand under current operations but would have to respond by increasing the number of seats. It should be noted that CNA campuses are primary areas for employers outside of the province to recruit and it is not unusual for the schools to see a significant percentage of new graduates lured from the province as soon as their training is complete. Local employers in need of skilled labour will need to compete by engaging in similar aggressive recruiting efforts. All campuses indicated that if industry were to increase its demand for skilled trades and work with CNA to focus on delivering incremental programs for same, they would respond very quickly, sometimes in as little as a week.

 Private Colleges – In the province there are 32 private institutions offering a wide rage of programs from office administration to heavy equipment operation (Jacques Whitford, 2007).

Within the study area, there are two Keyin College campuses, one located in Clarenville and the other in Marystown. Courses in both locations are focused on business management and administrative courses; there is no programming in skilled trades. Keyin also provides a course in Occupational Health and Safety at their Grand Falls–Windsor Campus. Centrac College offers a wide range of business, trades and technology programs, including skilled trades, at Marystown. Refer to Socio-Economic Component Study, Newfoundland and Labrador Refinery Project for an outline of private training programs throughout the province.

## 8.2 Project Effects

This section addresses the potential effects of the Project on the education and daycare systems with emphasis on education and training of workers of the Employment Catchment Area.

Generally, the labour force in the project region is considered to be highly skilled as a result of other large industrial projects that have been undertaken in the area; however, the recent absence or delays in developing large-scale projects in Placentia Bay has resulted in outmigration of workers and their families. The Refinery Project will require approximately 3,000 workers during the peak construction phase and 750 during the operations phase. The skills of these workers will range from very experienced to new entrants – depending on the task. In each case, clear demonstration of literacy and completed technical training will be essential. Prerequisites for almost all construction jobs are Grade 10 plus technical training such as an apprenticeship, or a high school diploma, plus specialty post-secondary training

There are two major potential effects of the project on education and training. They are effects on educational attainment including completion of high school, trades and other post-secondary training, and resources on literacy, education and training institutions to respond to demand for more services.

During construction it is not anticipated that a significant number of workers (male or female) will re-locate permanently to the Study Area with their families and therefore during this period, there will be no significant effect on the education system. However, throughout the operations phase some workers are expected to relocate into Study Area communities with their families, increasing demand for childcare and classroom space in Study Area primary schools. In addition, with increased demand for labour, women are more likely to enter the workforce, which will drive up childcare demand in the region. While increased demands for primary school student spaces can easily be accommodated in the school system, increased demands for childcare spaces will likely outstrip current supply. In the medium-term this will likely result in new childcare centres opening up in the Study Area to meet demand, but in the short-term,

when there are not enough spaces, additional demands will have to be met by family members (grandparents, older siblings) and could limit the ability of women to enter the labour force.

With the overall increase in population in the region, there is greater potential for higher student enrolment in post-secondary institutions including CNA, private colleges and MUN. The latter effect will take more years to become evident, depending on the ages of the children. If older workers with older children return to the province, then their children have the potential to enter post-secondary schools much sooner than those of younger families. While MUN has capacity to accept more students, CNA, which is short of classroom space and instructors, will have more challenges in accommodating new students.

Early childhood facilities (daycare) located in Placentia, Marystown and Clarenville have room for a few additional children, with the exception of the largest daycare of the four in Marystown, which is operating at capacity. Enrolments in primary schools in the Study Area have been declining for the past five years, with the exception of those in Clarenville, which has had steady enrolment over this period. Cumulatively, additional capacity exists for 2,533 students in Study Area communities. As is the case throughout the province, with a substantial decrease in school enrolment due to out-migration and declining birth rate, a rationalization of schools has occurred and will continue to occur.

## 8.3 Mitigation Measures

The Skills Task Force (Government of Newfoundland and Labrador, March 2007) has identified several issues respecting the provincial pool of skilled labour, noting that there are many workers in the province who have skills that could lead to certification in their field and provide employment; however, many do not proceed through the certification process. Reasons include not being able to secure sufficient work hours, the time and costs associated with further required skill development, access to additional training, difficulty in finding a mentor journeyman and the difficulty with writing the final certification exam. There are also other workers who may not have formal credentials but have ample experience to qualify for specific work.

There are a number of human resource strategies that NLRC can support and participate in to ensure the local labour pool has the required skills, certifications and/or other criteria, but they cannot be implemented by NLRC, alone. The unions, post-secondary educational institutions and government must work in partnership to coordinate a comprehensive strategy and execution plan.

NLRC will undertake specific mitigation measures to manage education and training needs. It will:

General:

- Prepare and implement a Project orientation training strategy to encourage and promote completion of secondary school. The strategy should include:
  - Attendance at local career fairs;
  - Supporting pre-employment training programs;
  - Development of a summer student employment program;
  - Providing post-secondary scholarships to outstanding high school students in the Study Area who demonstrate interest in trades for which a critical shortage exists;
  - Providing resource materials to primary and secondary high schools and libraries; and
  - Publicizing successful trades role models.
- Will work with post-secondary institutions and through other government programs to establish opportunities for supplemental educational opportunities, to boost Study Area literacy, based on project needs.

Secondary Schools:

- Continue with ongoing initiatives and school programs to encourage students at the secondary school level to pursue trade occupations for which a demand exists;
- Focus on encouraging women to pursue a trades occupation because, to date, they have been underemployed in the trades and they will represent the best new future source of job entrants in a market for which there is a strong skill shortage; and
- Continue to participate in school programs that encourage students to pursue occupations in required skilled trades.

Post-secondary Institutions:

- Provide post-secondary institutions as soon as possible with a list of required skills and certifications for both the construction and operation phases;
- Identify skill shortages and work with post-secondary institutions to ensure that programs are developed to address those shortages (e.g., process engineers, painters, equipment operators, operating engineers, insulators);
- Establish partnerships with post-secondary institutions to increase capacity, particularly in critical skills through offering of scholarships, apprenticeship training, co-op work-term experiences, corporate donations, graduate employment, and knowledge transfer and equipment donations;
- Work with CNA and private colleges to identify opportunities to leverage purchasing and training opportunities concurrently; and
- Work with post-secondary institutions on an ongoing basis to develop and implement an on- and off-site training plan in sufficient time for these institutions to meet the demand.

Apprenticeship Training:

• Work with government and unions to help identify strategies to streamline the process of certification;

- Work with unions and governments to establish strategies to support apprentices to obtain the number of work hours they need for the certification process;
- Work with unions to help individuals within post-secondary institutions to expedite certification through traditional apprenticeships, trade qualifiers, internships and direct entry;
- Work with unions to consider allowing journeypersons to mentor more than one apprentice;
- Consider providing in-house and/or mobile opportunities for apprentices to undertake mandatory skills development;
- Provide sufficient flexibility to workers that will enable them to take the necessary leaves to complete their skills training;
- Consider providing financial supports to employees that undertake training related to their occupational and work requirements;
- Work with other stakeholders to establish counselling, assistance and other strategies to better prepare workers for journeyperson exams; the goal should be to increase success rates on initial writing of same;
- Provide support for counselling for certification exams to apprentices prior to their writing;
- Work with unions to establish flexible work schedules and provide flexible leave allowances that will enable apprentices to complete their training to secure journeyman status;
- Consider options to help apprentices undertake additional training on or near site;
- Consider providing financial incentives to apprentices who complete their certification so as to minimize impact of reduced income associated with additional training required for their certification;
- Work with other stakeholders to identify strategies and opportunities to assist workers in obtaining the number of hours required for certification, including such strategies as permitting journeymen to supervise more than one apprentice; and
- Work with other stakeholders to consider a mechanism by which workers with appropriate skills can be assessed and their skills recognize.

#### Diversity:

- Develop strategies; including scholarships and awards in areas of math and science, to engage more women in skilled trades.
- Help to build community capacity by encouraging all members to continuous life-long education in order to take advantage of direct and indirect refinery-related work opportunities

#### On-site training:

• Work with CNA and private colleges to establish on-site training programs prior to and during the construction and operations phases.