Cacouna Energy
Gros Cacouna LNG Terminal

Marine Traffic Surveys

Prepared by

Maritime Innovation

for

Sandwell Engineering Inc.

April 2005

Table of Contents

Cacouna Energy
Gros Cacouna LNG Terminal
Quebec

8 April 2005

LIST OF TABLES

LIST OF FIGURES

1 Origin, Destination and Marine Traffic Volume

The information pertaining to vessel traffic presented in this section was provided by the Canadian Coast Guard's Marine Communications & Traffic Services (MCTS).

In Eastern Canadian waters, it is mandatory for vessels of 500 gross tonnage or more, or carrying dangerous goods, to report to the vessel traffic services. Other vessels such as yachts or fishing vessels of less than 500 gross tonnage can report to the MCTS on a voluntary basis. All passages and movements[1] within the areas described here are thus recorded in a database.

To complete the origin, destination and marine traffic volume survey, vessel trips and movements beginning or ending in 2003 and recorded in the MCTS database were used. Unless otherwise mentioned, the MCTS is the source for all tables presented in this section. Traffic in different areas cannot be summed because one distinct trip can cross more than one area. In this section, the directions of the vessel trips are obtained by comparing the coordinates of origins and the coordinates of destinations. For example, when the longitude was lower at the origin than that at the destination, a West direction was assigned to the particular vessel trip. When the latitude at the origin was lower at the origin than that at the destination, a North direction was assigned. The coordinates of origins or destinations for foreign vessels entering or leaving Canadian waters are often those at the entry or departure MCTS limits offshore Canada. In that sense, they do not always correspond to the coordinates of the ports of origin or destination. These directions were subsequently concatenated.

1.1 PROJECT RELATED TRAFFIC

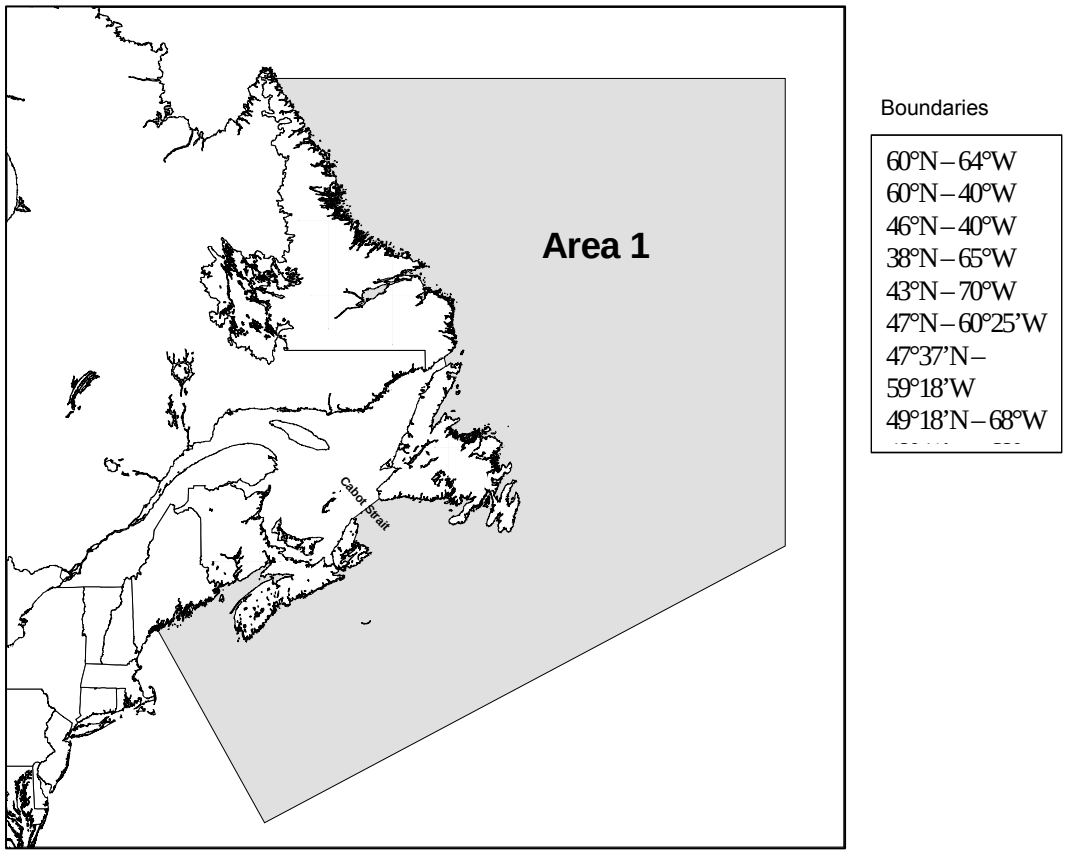
Depending on the actual size of the LNG carriers, there will be approximately 1 call per week at the Gros Cacouna LNG Terminal.

1.2 AREA 1: 200 MILE LIMIT TO CABOT STRAIT

[1] Movements are individual legs or locations within one passage. For example, within one passage, the vessel will report its location a certain number of times and these reports are considered to be movements.

Figure 1-1 illustrates the zone covering the traffic described in Area 1. The zone extends beyond the 200 mile limit and covers vessel passages originating from or destined to Canadian waters. This zone was selected to facilitate the process of querying the MCTS database. All passages for which movements were reported in this zone were selected for analysis.

Figure 1-1
Area 1 Limits



1.2.1 Deep Sea Commercial Traffic

Deep sea commercial traffic consists of foreign vessels coming into or leaving Canadian waters. The MCTS database reveals that 12,977 trips were made in Area 1 in 2003 by foreign registered vessels.

Table 1-1 presents these trips according to their direction and type of vessel.

Table 1-1
Direction & Vessel Types for Passages Made in Area 1 (2003)

Type / Direction	S-W	N-E	S-E	N-W	None	E	W	N	Total
Tanker	937	1,062	429	470	44				2,942
Dry bulk	593	679	916	666	17				2,871
Container	876	650	498	435	7				2,466
General cargo	457	515	427	260	16				1,675
Fishing	130	43	369	266	21			1	830
Ro-Ro	318	183	39	44	5				589
Passenger	149	141	80	70	1				441
Chemical	99	76	123	98	3				399
Tug	64	78	50	46	11				249
Special purpose	37	20	68	59	22	7	4	3	220
Yacht	41	27	20	29	1				118
Oil bulk ore (OBO)	30	30	20	28	1				109
Barge	6	6	9	11	8				40
Military	3		7	5					15
Dredge			6	4					10
LNG	1		1	1					3
Total	**3,741**	**3,510**	**3,062**	**2,492**	**157**	**7**	**4**	**4**	**12,977**

The three LNG passages recorded by the MCTS were made by 2 different vessels. The *Johann Schulte* is actually a 17,914 DWT LPG vessel[2] that was reported passing in Canadian waters at the beginning of 2003. Similarly, although the *Berge Rachel* is reported as being an LNG carrier by the MCTS, it is actually a LPG vessel[3] that went up to Quebec and Montreal in June and left Canada in July.

Passages with a "None" direction designation were made by foreign vessels reported as having the same origin and destination. Many of these passages were made by tankers, tugs, special purpose vessels or support vessels within the oil and gas exploitation platform zones located off Newfoundland or Nova Scotia. Other passages with this "None" direction designation were made by foreign vessels reporting passages to and from port or anchorage areas.

Table 1-2 presents directions and deadweight tonnage (DWT) class for tanker passages in Area 1 reported in 2003. Major Canadian destinations for these passages are Come By Chance, Whiffen Head, Strait of Canso, Saint-Romuald, Saint John, Point Tupper, Dartmouth and Sydney. Approximately 6% of these passages were destined to the Gulf of St Lawrence or Laurentian regions. About an equal number of passages leave these areas for destinations overseas.

[2] *Source:* Lloyd's Shipping Information Database, Version 2.2. January 2005.
[3] *Ibid*.

Table 1-2
DWT Class & Direction of Foreign Tanker Passages in Area 1 (2003)

DWT Class / Direction	N-E	S-W	N-W	S-E	None	Total
< 10 000	4	15	19	21		59
10 - 19 999	192	149	51	63	11	466
20 - 29 999	83	76	33	26	1	219
30 - 39 999	196	165	41	26	7	435
40 - 49 999	186	143	97	64	6	496
50 - 59 999	10	7	6	5		28
60 - 69 999	44	33	27	29	2	135
70 - 79 999	7	10	6	9		32
80 - 89 999	11	13	10	7	1	42
90 - 99 999	151	147	19	6	4	327
100 - 109 999	46	37	16	8	1	108
110 - 119 999	28	38	5	9	1	81
130 - 139 999	3	6	8	11		28
140 - 149 999	20	37	50	67	2	176
150 - 159 999	34	26	18	23	2	103
160 - 169 999	7	6	4	4		21
250 - 259 999			2	1		3
270 - 279 999	2	2	9	9	1	23
280 - 289 999		1	4	2		7
290 - 299 999	11	9	15	12		47
300 - 309 999	24	16	26	23	4	93
310 - 319 999	3	1	3	3	1	11
320 - 329 999			1	1		2
Total	**1 062**	**937**	**470**	**429**	**44**	**2 942**

Table 1-3 presents dry bulk vessel passages by DWT class and direction. Major destinations for these passages were the principal dry bulk terminals of Eastern Canada like Hantsport, Sept-Îles, Port-Cartier, Port-Alfred, Halifax and Dartmouth. Of the 2,871 passages in Area 1, approximately 26% of them were destined for the St. Lawrence Seaway or the Great Lakes, while 29% had these regions as their point of origin.

Table 1-3
DWT Class & Direction of Foreign Dry Bulk Vessel Passages in Area 1 (2003)

DWT Class / Direction	S-E	N-E	N-W	S-W	None	Total
< 10 000	24	61	21	52	1	159
10 - 19 999	116	151	69	125	9	470
20 - 29 999	206	67	151	50		474
30 - 39 999	223	118	138	117	1	597
40 - 49 999	91	136	44	82	2	355
50 - 59 999	17	4	11	10	1	43
60 - 69 999	47	31	40	41	1	160
70 - 79 999	109	89	115	89	1	403
80 - 89 999	1	1				2
120 - 129 999	5		5	1		11
130 - 139 999	10		9	2		21
140 - 149 999	12	3	10	4		29
150 - 159 999	9		8	1		18
160 - 169 999	13	2	10	4		29
170 - 179 999	25	9	28	8	1	71
210 - 219 999	8	7	7	7		29
Total	**916**	**679**	**666**	**593**	**17**	**2 871**

Foreign container vessels entering Area 1 are mostly destined to Halifax or Montreal. Other destinations for container vessel passages are Argentia, Saint John and Shelburne. Table 1-4 presents the direction and DWT class for container vessels coming through Area 1.

Table 1-4
DWT Class & Direction of Foreign Container Vessel Passages in Area 1 (2003)

DWT Class / Direction	S-W	N-E	S-E	N-W	None	Total
< 10 000	211	205	91	72	3	582
10 - 19 999	63	65	72	79	2	281
20 - 29 999	34		24	58		116
30 - 39 999	111	31	125	46	1	314
40 - 49 999	117	87	85	39		328
50 - 59 999	159	157	44	63		423
60 - 69 999	181	105	57	78	1	422
Total	**876**	**650**	**498**	**435**	**7**	**2 466**

Foreign general cargo vessel traffic in Area 1 accounted for 1,675 passages in 2003. Most of these trips are destined for general cargo terminals in Saint John and Halifax. There is no specific traffic pattern as these vessels regularly sail according to the calls at the time. Table 1-5 presents the direction and DWT class for foreign general cargo vessel passages in Area 1.

Table 1-5
DWT Class & Direction of Foreign General Cargo Vessel Passages in Area 1 (2003)

DWT Class / Direction	N-E	S-W	S-E	N-W	None	Total
< 10 000	199	233	213	119	9	773
10 - 19 999	200	132	139	80	3	554
20 - 29 999	62	31	31	7	1	132
30 - 39 999	12	14	26	27	3	82
40 - 49 999	36	34	14	21		105
50 - 59 999	6	13	4	6		29
Total	**515**	**457**	**427**	**260**	**16**	**1 675**

1.2.2 Coastal Commercial Traffic

Coastal commercial traffic is made up of Canadian flagged vessels. In Area 1, the number of passages of this nature total 20,445. Table 1-6 presents the number of passages by vessel type and direction of sailing. Many passages made by tugs, barges, special purpose vessels, fishing vessels and passenger vessels are recorded as having the same origin and destination.

Table 1-6
Coastal Commercial Traffic by Vessel Type and Direction in Area 1 (2003)

Type / Direction	None	N-E	S-W	S-E	N-W	E	S	W	Total
Tug	978	618	583	1,613	1,610		1		5,403
Fishing	295	1,369	1,321	1,020	891		1		4,897
Special purpose	1,428	377	388	566	554				3,313
Ferry	1,122	1,006	1,001	41	40				3,210
Tanker	18	386	309	449	404	10			1,576
Passenger	374	177	168	33	32				784
Container	2	114	108	58	99				381
Chemical	1	27	42	65	52	1		2	190
General cargo		39	54	51	38				182
Dry bulk	2	41	31	34	48				156
Dredge	49	18	23	24	25		1		140
Ro-Ro		48	48	2	5				103
Yacht	5	10	13	7	15				50
Barge	13	8	5	6	13				45
Military		1	2	2	4				9
LASH	3								3
OBO		1	1						2
Hovercraft		1							1
Total	**4,290**	**4,241**	**4,097**	**3,971**	**3,830**	**11**	**3**	**2**	**20,445**

LASH stands for Lighter Aboard Ship. It is a specialized container ship carrying floating containers, or "lighters." The ship carries its own crane, which loads and discharges the containers over the stern. The lighters each have a capacity of typically 400 tons and are stowed in the holds and on deck.

Approximately 47% of tug traffic is made by harbour tugs and pushing (or pulling) tugs. Supply tugs, accounted for 31% of the tug trips. Many of them service offshore exploitation activities and are based in Saint John's and Halifax. In 2003, Sable Island, Terra Nova and Hibernia have respectively received 194, 158, and 129 supply tug trips.

Almost 76% of passages made by special purpose vessels were made within the Maritimes region. The other main region of origin for special purpose vessels is Newfoundland. Some of these passages were made by supply vessels. Approximately 47% of the special purpose vessel passages were made by Coast Guard vessels.

Table 1-7 reveals that fishing vessels making passages in Area 1 generally stay in their region of operation. For example, more than 94% of all fishing vessel passages originating in the Maritimes also had their destination in the Maritimes. The same is true for passages originating in Newfoundland. Most of the barge traffic recorded had their origins and destinations in Saint John.

Table 1-7
Origin and Destination Region for Fishing Vessel Passages in Area 1 (2003)

Origin / Destination	Maritimes	Newfoundland	Unspecified	Arctic	Laurentian	Total
Maritimes	3 491	78	133	1	4	3 707
Newfoundland	37	780	5	1		823
Unspecified	209	130	14	1		354
Laurentian	6	2				8
Arctic	1	2	1	1		5
Total	**3 744**	**992**	**153**	**4**	**4**	**4 897**

Coastal traffic of Canadian tankers in Area 1 was made by 15 different tankers in 2003. Table 1-8 presents each tanker by DWT class and by number of passages made in 2003 according to its direction. The *Imperial Dartmouth* basically links Halifax and Dartmouth. The *Mokami* is mainly active in Newfoundland and on the Lower North Shore region of Quebec. Both Irving vessels mostly stay within the Maritimes region and occasionally sail to Newfoundland. They also regularly go to Charlottetown (PEI). In 2003, the Jade Star, the *Vega Desgagnés,* and the *Maria Desgagnés* do not have a specific sailing region and serviced all of Eastern Canada, while the *Algosar* is mainly active on the Nova Scotia coast and the *Tuvaq* regularly sails to Northern Canada. Finally, the *Avalon Spirit*, the *Kometik*, the *Mattea* and the *Vinland* all service either the Hibernia or Terra Nova Fields and regularly sail to Whiffen Head for unloading.

Table 1-8
Canadian Tanker Passages in Area 1 (2003)

		Direction						
Name	DWT Class	S-E	N-W	N-E	S-W	None	E	Total
IMPERIAL DARTMOUTH	< 10 000	200	188	81	87	8		564
MOKAMI	< 10 000	23	17	11	10	2		63
PETROLIA DESGAGNES	< 10 000	4	4	3	3			14
THALASSA DESGAGNES	< 10 000	4	2	33	20	1		60
IRVING CANADA	30 - 39 999	5	3	87	51	2		148
IRVING ESKIMO	30 - 39 999	18	9	68	44			139
ALGOSAR	10 - 19 999	19	15	44	34	2		114
JADE STAR	10 - 19 999	13	6	5	9	1		34
MARIA DESGAGNES	10 - 19 999	4	3	2	3			12
TUVAQ	10 - 19 999	6	5	10	7			28
VEGA DESGAGNES	10 - 19 999	8	6	3	6			23
AVALON SPIRIT	100 - 109 999	1	1	29	28	1		60
KOMETIK	120 - 129 999	52	52			1	4	109
MATTEA	120 - 129 999	44	43	6	6		5	104
VINLAND	120 - 129 999	48	50	4	1		1	104
	Total	449	404	386	309	18	10	1 576

Container vessel passages in Area 1 were recorded by three ships. The *ASL Sanderling* sails on a regular route linking Halifax, Dartmouth, Corner Brook and Saint John's while the *Cicero* sails also on a regular route between Montreal and Saint John's and occasionally Corner Brook. The other Canadian container vessel is the *Astron* which sails to the Arctic from Newfoundland or Saint Lawrence ports. Of the 12 Canadian general cargo vessels

that passed in Area 1 in 2003, all but the *Anna Desgagnés* were under 10,000 DWT. Some of these vessels pass through the area to reach the Arctic while others service regional ports. A total of nine different Canadian bulkers (dry bulk) passed through Area 1 in 2003. Table 1-9, Table 1-10, and Table 1-11 present the detailed passages for container, general cargo and dry bulk vessels.

Table 1-9
Canadian Containership Passages in Area 1 (2003)

		Direction					
Name	**DWT Class**	**N-E**	**S-W**	**N-W**	**S-E**	**None**	**Total**
ASL SANDERLING	10 - 19 999	55	57	88	48	2	250
ASTRON	< 10 000	10	8	5	10		33
CICERO	< 10 000	49	43	6			98
	Total	**114**	**108**	**99**	**58**	**2**	**381**

Table 1-10
Canadian General Cargo Passages in Area 1 (2003)

		Direction				
Name	**DWT Class**	**S-W**	**S-E**	**N-E**	**N-W**	**Total**
AMELIA DESGAGNES	< 10 000	14	3	14	1	32
CATHERINE DESGAGNES	< 10 000	4		3		7
CECILIA DESGAGNES	< 10 000	3		2	1	6
GULF SABLE	< 10 000			1		1
JACQUES DESGAGNES	< 10 000		2		2	4
MARINE EAGLE	< 10 000				1	1
MARINE VOYAGER	< 10 000		3		2	5
MATHILDA DESGAGNES	< 10 000	8		8		16
MELISSA DESGAGNES	< 10 000	14	4	5	2	25
PLACENTIA SOUND	< 10 000	1			1	2
POLAR PRINCE	< 10 000		6		3	9
SAINT ORAN	< 10 000	8	30	5	23	66
ANNA DESGAGNES	10 - 19 999	2	3	1	2	8
	Total	**54**	**51**	**39**	**38**	**182**

Table 1-11
Canadian Dry Bulk Passages in Area 1 (2003)

		Direction					
Name	**DWT Class**	**N-W**	**N-E**	**S-E**	**S-W**	**None**	**Total**
SAUNIERE	20 - 29 999	13	3	12	5	1	34
SPRUCEGLEN	30 - 39 999			2	2		4
ALGOPORT	30 - 39 999	8	5	5	2		20
ATLANTIC ERIE	30 - 39 999	4	2	3	1		10
ATLANTIC HURON	30 - 39 999	11	5	4	2		22
ATLANTIC SUPERIOR	30 - 39 999	3	21	5	17		46
FERBEC	50 - 59 999		1		2	1	4
MARIJEANNIE	70 - 79 999	1		1			2
NANTICOKE	30 - 39 999	8	4	2			14
	Total	**48**	**41**	**34**	**31**	**2**	**156**

1.2.3 Recreational Boating and Sailing Activities

As in other areas, recreational boating and sailing activities are essentially undertaken near the coast. Most trips made by these boats are thus not recorded by the vessel traffic services unless the skipper judges it necessary. When a skipper advises vessel traffic services, it is usually when he is undertaking long journeys such as crossing the Atlantic, which will require him to transit in commercial navigation routes. Table 1-12 presents the passages of yachts reported by the vessel traffic services in Area 1 in 2003. Amongst those trips, three were made between the Laurentian and Maritimes regions and one was made between the Laurentian region and Newfoundland. For foreign registered yachts, a total of 118 passages were recorded in Area 1.

Table 1-12
Canadian Registered Yacht Passages in Area 1 (2003)

Name / Direction	N-W	S-W	N-E	S-E	None	Total
SEDNA IV	4	3	4	2	1	14
BLUENOSE II	2	5	4		2	13
CALEDONIA	2	1		2		5
ELSIE MINOTA	2	1			2	5
KLOOSH	3		1			4
LOTHA		1		1		2
UNICORN		1	1			2
BEST AND SHOW		1				1
MILK AND HONEY				1		1
MOONSHINE	1					1
NIGHTTRAIN	1					1
TOO ELUSIVE				1		1
Total	**15**	**13**	**10**	**7**	**5**	**50**

1.2.4 Ferry Routes and Schedules

Marine Atlantic operates 3 passenger ferries along two routes - the traditional, year-round Port aux Basques to North Sydney route and the additional summer season Argentia to North Sydney route. According to the time of the year and the day of the week, between 2 and 3 crossings per day are made from North Sydney to Port aux Basques while there are 3 crossings per week on the North Sydney to Argentia route from mid-June, to mid-September. For the rest of September, only one crossing per week is made.

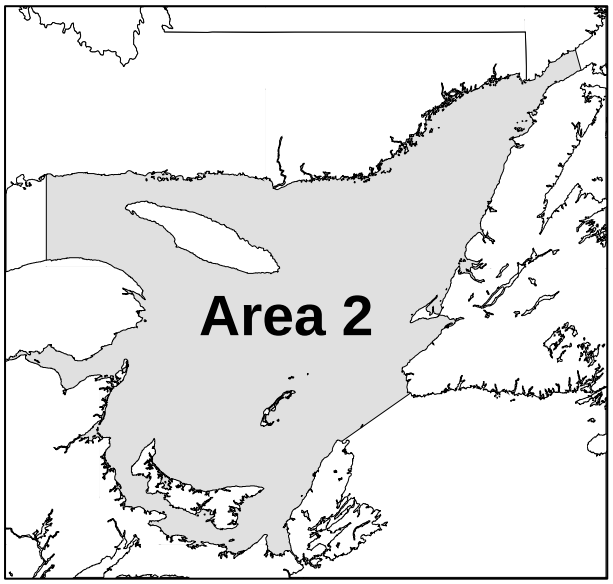
In Newfoundland and Labrador, 16 different ferry services exist. Except for the Blanc Sablon to St Barbe crossing in the Strait of Belle Isle, the services link the small islands to the main island or to mainland Labrador[4].

[4] Precise schedule for all these crossings can be viewed at: http://www.gov.nf.ca/ferryservices/

1.3 AREA 2: GULF OF ST. LAWRENCE

Figure 1-2 illustrates Area 2. The Gulf of St Lawrence covers all waters West of a line traced in the Cabot Strait between 47°N – 65°25'W and 47°37'N – 59°18'W, west of another line in the Strait of Belle Isle traced between 51°35'N – 60°W and 51°54'N – 60°W and East of a line traced on longitude 66°W. All trips which reported movements reported in this zone were selected for analysis.

Figure 1-2
Area 2, Gulf of St Lawrence



1.3.1 Deep Sea Commercial Traffic

A total of 4,228 foreign vessel passages were recorded in the Gulf of St Lawrence in 2003. Table 1-13 presents these trips according to their direction and type of vessel. Dry bulk, general cargo, container and tanker trips accounted for nearly 88% of all of these trips.

Table 1-13
Direction and Vessel Types for Passages of Foreign Vessels in Area 2 (2003)

Type / Direction	S-E	N-W	S-W	N-E	None	Total
Dry Bulk	752	567	214	225	1	1 759
General cargo	297	143	205	236	2	883
Container	237	107	200	72		616
Tanker	204	131	83	35		453
Chemical	100	61	38	15		214
Passenger	49	40	27	19		135
Ro-Ro	29	13	14	21		77
OBO	13	12	2	6		33
Yacht	12	6	4	7	1	30
Tug	5	3	2	5		15
Special purpose	4	1	2	1		8
LNG	1	1	1			3
Dredge	1					1
Fishing		1				1
Total	**1 704**	**1 086**	**792**	**642**	**4**	**4 228**

Passages reported as being made by LNG vessels are actually LPG passages. They are the same as the ones reported in section 1.2.1. Table 1-14 presents the detailed DWT class and direction of passages made by foreign bulkers in Area 2. Almost two-thirds of these passages were made by vessels in the 10,000 to 50,000 DWT range. Major destinations for these passages were Sept-Îles, Montreal, Port-Cartier, Port Alfred, Belledune and Québec. Approximately 5% of these passages were destined for the St. Lawrence Seaway and the Great Lakes.

Table 1-14
DWT Class and Direction of Foreign Dry Bulk Passages in Area 2 (2003)

DWT Class / Direction	S-E	N-W	N-E	S-W	None	Total
< 10 000	13	10	6	2		31
10 - 19 999	61	39	17	19		136
20 - 29 999	192	137	58	46		433
30 - 39 999	193	114	51	58		416
40 - 49 999	53	25	32	9		119
50 - 59 999	15	9	2	2		28
60 - 69 999	43	37	3	10		93
70 - 79 999	99	117	34	41	1	292
80 - 89 999	1		1			2
120 - 129 999	5	5		1		11
130 - 139 999	10	9		2		21
140 - 149 999	12	11	3	4		30
150 - 159 999	9	8		1		18
160 - 169 999	13	11	2	4		30
170 - 179 999	25	28	9	8		70
210 - 219 999	8	7	7	7		29
Total	**752**	**567**	**225**	**214**	**1**	**1 759**

As can be seen in Table 1-15, foreign general cargo vessels in Area 2 are smaller in size than bulkers. Many of these vessels come to the Gulf of St Lawrence on a regular basis to carry forest products and paper from Newfoundland and Laurentian ports.

Table 1-15
DWT Class and Direction of Foreign General Cargo Passages in Area 2 (2003)

DWT Class / Direction	S-E	N-E	S-W	N-W	None	Total
< 10 000	144	71	94	73		382
10 - 19 999	94	112	80	47		333
20 - 29 999	36	44	19	5		104
30 - 39 999	19	7	4	13	1	44
40 - 49 999	3	2	5	4		14
50 - 59 999	1		3	1	1	6
Total	**297**	**236**	**205**	**143**	**2**	**883**

Foreign containerships coming in the Gulf of St Lawrence essentially go to Montreal. Their main direction and DWT class are presented in Table 1-16.

Table 1-16
DWT Class and Direction of Foreign Containerships in Area 2 (2003)

DWT Class / Direction	S-E	S-W	N-W	N-E	Total
< 10 000	5	3	1		9
10 - 19 999	54	2	52	1	109
20 - 29 999	1		1		2
30 - 39 999	124	109	45	29	307
40 - 49 999	53	86	8	42	189
Total	237	200	107	72	616

Foreign tankers in the 140 to 149,999 DWT range were all destined to Saint-Romuald. Nearly 75% of all trips were destined either to the Laurentian or Newfoundland ports. Table 1-17 presents the direction and DWT class for tankers passing in the Gulf of St Lawrence.

Table 1-17
DWT Class and Direction of Foreign Tankers in Area 2 (2003)

DWT Class / Direction	S-E	N-W	S-W	N-E	Total
< 10 000	8	5	2		15
10 - 19 999	35	24	23	20	102
20 - 29 999	17	7	8	4	36
30 - 39 999	10	7	5	2	24
40 - 49 999	24	14	7	3	48
50 - 59 999	4	3	1		8
60 - 69 999	23	18	5	5	51
70 - 79 999	5	2	3	1	11
80 - 89 999	4	5			9
110 - 119 999			1		1
130 - 139 999	11	8	3		22
140 - 149 999	55	34	22		111
150 - 159 999	7	4	2		13
160 - 169 999	1		1		2
Total	204	131	83	35	453

Table 1-18, Table 1-19 and Table 1-20 present the vessel DWT class and direction for chemical tankers, passenger vessels and ro-ro (roll-on/roll-off; primarily auto carriers) vessels.

Table 1-18
DWT Class and Direction of Foreign Chemical Carriers in Area 2 (2003)

DWT Class / Direction	S-E	N-W	S-W	N-E	Total
< 10 000	15	14			29
10 - 19 999	45	18	24	9	96
20 - 29 999	7	2	4	2	15
30 - 39 999	13	14	2	3	32
40 - 49 999	20	13	8	1	42
Total	100	61	38	15	214

Table 1-19
DWT Class and Direction of Foreign Passenger Vessels in Area 2 (2003)

DWT Class / Direction	S-E	N-W	S-W	N-E	Total
< 10 000	46	37	27	19	129
10 - 19 999	1	1			2
60 - 69 999	2	2			4
Total	49	40	27	19	135

Table 1-20
DWT Class and Direction of Foreign Ro-Ro Vessels in Area 2 (2003)

DWT Class / Direction	S-E	N-E	S-W	N-W	Total
< 10 000	12	9	9	7	37
10 - 19 999	17	12	5	6	40
Total	29	21	14	13	77

1.3.2 Coastal Commercial Traffic

As can be seen in Table 1-21, Canadian vessels made 3,530 passages in Area 2 in 2003. Ferries, special purpose vessels and barges often record their passages with the same origin and destination and, for this reason, they appear in this table as having no direction. The special purpose vessels were mainly Coast Guard ships such as icebreakers and buoy tenders, as well as oceanographic research vessels. Passenger vessel traffic in 2003 was made by two vessels. The *CTMA Voyageur* carried trucks and passengers from Montreal and Matane to the Magdalen Islands while the *Echo des Mers* was a small cruise ship. Both of them are under 10,000 DWT. There is a whale watching industry located North-East of Cape Breton Island in Pleasant Bay, although this traffic does not appear in the MCTS database,. This industry thus generates supplementary passenger vessel traffic in Area 2. The passages made by containerships, general cargo, and ro-ro vessels were the same ones as in Area 1. Although the number of trips in each Area may differ slightly, they are the same vessels.

Table 1-21
Direction and Vessel Type for Canadian Passages Made in Area 2 (2003)

Type / Direction	N-E	S-W	N-W	S-E	None	N	Total
Ferry	311	311	40	30	173		865
Tug	140	144	173	175	6		638
Dry Bulk	158	135	72	54	3		422
Special purpose	72	76	72	90	43	1	354
Tanker	114	83	49	62	4		312
Container	58	93	42	2	1		196
Passenger	52	59	31	35	2		179
General cargo	57	61	27	29			174
Chemical	25	33	20	35			113
Ro-Ro	49	48	2				99
Fishing	44	41	3	7			95
Barge	4		2	1	54		61
Yacht	3	5	2	4	1		15
Hovercraft	1		1	1			3
OBO	1	1					2
Military	2						2
Total	**1,091**	**1,090**	**536**	**525**	**287**	**1**	**3,530**

A total of 16 Canadian dry bulk vessels made the 422 passages in Area 2 in 2003. Most of these vessels (14) had less than 40,000 DWT. Only the *Ferbec* which is on a regular route between Havre-Saint-Pierre and Sorel, and the *Marijeannie* which is now foreign flagged, were larger. Canadian bulkers are active in many trades of which salt and iron ore are the main cargoes carried within Area 2. Table 1-22 presents Canadian dry bulk vessel traffic in Area 2 according to their DWT class and direction.

Table 1-22
DWT Class and Direction of Canadian Bulkers in Area 2 (2003)

DWT Class / Direction	N-E	S-W	N-W	S-E	None	Total
20 - 29 999	58	54	19	19	3	153
30 - 39 999	61	42	52	34		189
50 - 59 999	39	39				78
70 - 79 999			1	1		2
Total	**158**	**135**	**72**	**54**	**3**	**422**

There were 10 Canadian tankers passing through Area 2 in 2003 which made a total of 312 passages. These vessels mainly carried petroleum products to shore side industrial facilities such as pulp and paper mills, aluminium smelters, and electricity power plants. They also delivered these products to tank farms for local delivery. In that sense, most passages were made between domestic ports and originated from Saint-Romuald, Dartmouth, and Saint John. Table 1-23 presents the number of passages, direction and DWT class for each of the tankers that sailed in Area 2 in 2003.

Table 1-23
Canadian Tanker Passages in Area 2 (2003)

		Direction					
Name	DWT Class	N-E	S-W	S-E	N-W	None	Total
PETROLIA DESGAGNES	< 10 000	10	10	7	3	1	31
MOKAMI	< 10 000	5	8	5	4		22
THALASSA DESGAGNES	< 10 000	8	6	3	2		19
ALGOSAR	10 - 19 999	14	23	9	10	3	59
JADE STAR	10 - 19 999	14	16	12	5		47
VEGA DESGAGNES	10 - 19 999	6	9	9	3		27
MARIA DESGAGNES	10 - 19 999	3	5	6	3		17
TUVAQ	10 - 19 999	6	4	1	3		14
IRVING ESKIMO	30 - 39 999	27	2	7	11		47
IRVING CANADA	30 - 39 999	21		3	5		29
	Total	**114**	**83**	**62**	**49**	**4**	**312**

Chemical tankers basically service the same industries as other tankers. Table 1-24 presents their direction of sailing in Area 2 in 2003.

Table 1-24
Canadian Chemical Tanker Passages in Area 2 (2003)

Name	DWT Class	Direction S-E	S-W	N-E	N-W	Total
EMERALD STAR	10 - 19 999	7	15	15		37
ALGOCATALYST	10 - 19 999	15	3	2	14	34
DIAMOND STAR	10 - 19 999	7	8	6	2	23
SIBYL W	< 10 000	6	7	2	4	19
Total		**35**	**33**	**25**	**20**	**113**

1.3.3 Recreational Boating and Sailing Activities

In the Quebec portion of Area 2, there are 11 marinas offering services to recreational boaters. Most sailing activities consist of coastal navigation between these marinas which had 1,104 spaces for seasonal rent and a supplementary 316 spaces for visitors. Table 1-25 lists the marinas and their reception capacity. In 2003, 45 yachts trips (including foreign yachts) were reported to vessel traffic services in Area 2. As in Area 1, it is considered that recreational boaters venturing farther off the coast are the ones reporting the MCTS.

Table 1-25
Area 2 Marinas Located in Quebec

Marina	Seasonnal	Visitors
Havre-Saint-Pierre	62	10
Gaspé	35	65
Rivière-aux-Renards	25	15
Percé	40	15
Chandler	59	14
Bonaventure	50	10
Carleton	22	2
New-Richmond	64	8
Cap-aux-Meules	90	9
Havre-aux-Maisons	45	10
Havre-Aubert	612	158
Total	**1 104**	**316**

Source : marinaquebec.qc.ca

1.3.4 Ferry Routes and Schedules

Table 1-26 presents the number of ferry passages by vessel reported in Area 2 in 2003. The *Madeleine* links the Magdalene Islands to Prince Edward Island on a daily basis except during summer when two crossings were made, and from January to the end of March when the ferry runs stopped. The *Apollo* is the vessel operated by the Government of Newfoundland and Labrador between St. Barbe and Blanc Sablon. The *Confederation* crosses between Wood Island (PEI) and Caribou (NS) on a daily schedule comprising between 3 and 9 crossings according to the time of the year. The *Holiday Island* was used

on the same route during the summer 2003 season. The *Nordik Express* offers a ferry and cargo service between Rimouski and the Lower North Shore region. Finally, trips made by the *CNM Evolution* and the *Caribou* in Area 2 were not part of a regular ferry service.

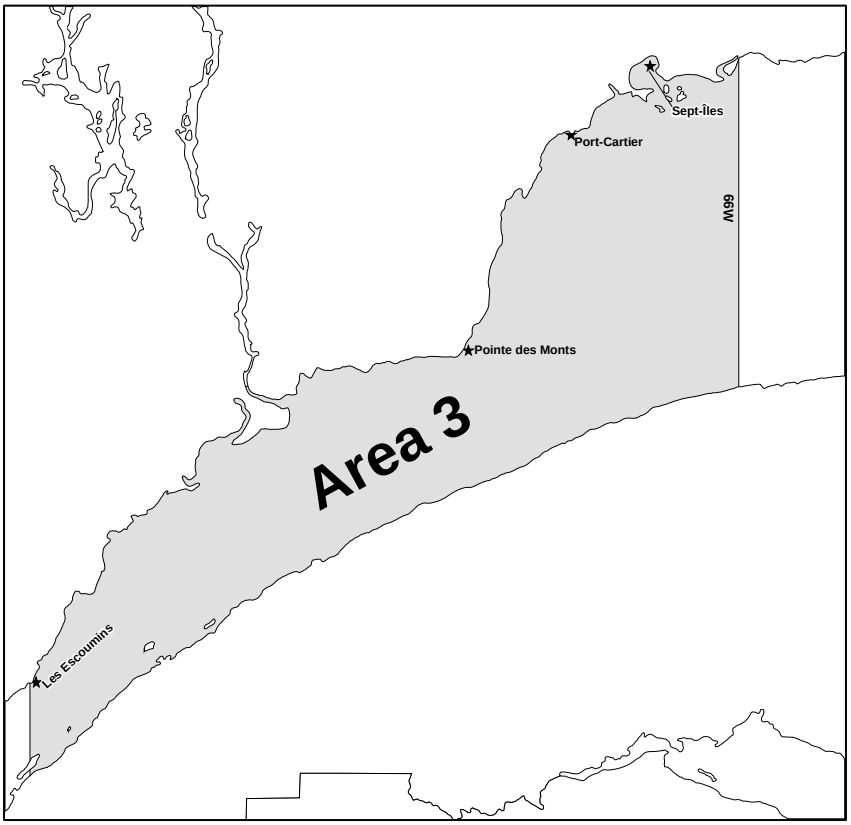
Table 1-26
Ferry Traffic in Area 2 (2003)

Vessel / Direction	S-W	N-E	None	N-W	S-E	Total
MADELEINE	270	270	2			542
APOLLO			170	40	29	239
NORDIK EXPRESS	40	41				81
CNM EVOLUTION	1				1	2
CARIBOU			1			1
Total	**311**	**311**	**173**	**40**	**30**	**865**

1.4 AREA 3: ST. LAWRENCE ESTUARY FROM LES ESCOUMINS TO 66W

Figure 1-3 illustrates Area 3. The St Lawrence Estuary from Les Escoumins to 66°W covers all waters west of a line traced from north to south on longitude 66°W and east of another line also traced from north to south on longitude 69°25'W. All reported passages in this zone were selected for analysis. For logical purposes, the directions of traffic in this section are given on an up bound (westward) and down bound (eastward) of the St Lawrence basin. It is important to note that all commercial traffic going up in the River merges in the middle of the St Lawrence off Pointe-des-Monts. It is also at that point where international traffic in the down bound direction and leaving Canadian waters will take either the southern route towards the Cabot Strait or the northern route towards the Strait of Belle Isle. Down bound traffic having either Sept-Îles or Port-Cartier as a destination also follows specific N-E navigation routes once arrived at Pointe-des-Monts.

Figure 1-3
Area 3, Les Escoumins to 66°W



1.4.1 Deep Sea Commercial Traffic

Table 1-27 presents foreign vessel traffic in Area 3 according to the direction and type of vessel. These passages reflect vessels in the international trade that use St Lawrence and Great Lakes ports. Dry bulk passages account for about 46% of all passages made in Area 3. General cargo, containerships and tankers respectively represent 17%, 16% and 10% of total passages. The major ports within this region where international passages are recorded are Sept-Îles, Port-Cartier, Baie-Comeau and to a lesser extent, Gros-Cacouna and Matane.

Table 1-27
Direction and Type of Foreign Vessel Passages in Area 3 (2003)

Type	Downbound	Upbound	None	Total
Dry bulk	1 051	790	9	1 850
General cargo	409	255	4	668
Container	313	306		619
Tanker	213	184		397
Chemical	114	90		204
Passenger	41	38		79
Ro-ro	38	23		61
Yacht	19	19	3	41
OBO	25	15		40
Tug	7	3		10
Special purpose	4	2		6
LNG	1	1		2
Barge			1	1
Dredge	1			1
Total	**2 236**	**1 726**	**17**	**3 979**

The passages reported as being made by a LNG vessel were made by the *Berge Rachel*, an LPG vessel that went up the St Lawrence to Quebec and Montreal. These two trips will also be reported in Area 4. Approximately 20% of all dry bulk passages had Port-Cartier or Sept-Îles as either their point of origin or destination. Typically, these passages are made by larger sized vessels. Table 1-28 presents foreign dry bulk passages according to DWT class and direction.

Table 1-28
DWT Class and Direction for Foreign Dry Bulk Passages in Area 3 (2003)

DWT Class	Downbound	Upbound	None	Total
< 10 000	18	11		29
10 - 19 999	79	52		131
20 - 29 999	249	194	2	445
30 - 39 999	255	181	2	438
40 - 49 999	94	30	2	126
50 - 59 999	25	12		37
60 - 69 999	59	49		108
70 - 79 999	150	155	2	307
80 - 89 999	2			2
120 - 129 999	5	6		11
130 - 139 999	13	11		24
140 - 149 999	17	15		32
150 - 159 999	10	9		19
160 - 169 999	18	15	1	34
170 - 179 999	39	36		75
210 - 219 999	18	14		32
Total	**1 051**	**790**	**9**	**1 850**

About 1/3 of the general cargo passages had either their destination or their origin in Area 3. The rest of these passages passed through the area. The origins and destinations for foreign general cargo vessels in Area 3 are Baie-Comeau, Matane and Gros-Cacouna. Table 1-29 presents foreign general cargo passages by DWT class and direction.

Table 1-29
DWT Class and Direction for Foreign General Cargo Passages in Area 3 (2003)

DWT Class	Downbound	Upbound	None	Total
< 10 000	197	130	2	329
10 - 19 999	141	79	2	222
20 - 29 999	44	28		72
30 - 39 999	23	16		39
40 - 49 999	3	1		4
50 - 59 999	1	1		2
Total	**409**	**255**	**4**	**668**

Table 1-30 presents the data for containerships passing through Area 3. Other than a few exceptions, these vessels are all bound or come from Montreal.

Table 1-30
DWT Class and Direction for Foreign Containership Passages in Area 3 (2003)

DWT Class	Downbound	Upbound	Total
< 10 000	9	5	14
10 - 19 999	53	52	105
20 - 29 999	1	1	2
30 - 39 999	155	154	309
40 - 49 999	95	94	189
Total	**313**	**306**	**619**

Other than Baie-Comeau, Port-Cartier and Sept-Îles, all foreign tanker passages go through Area 3. Larger sized tankers are destined and come from Saint-Romuald while others are up bound and go to Québec, Montreal and the Great Lakes. Table 1-31 presents directions and DWT class for these passages.

Table 1-31
DWT Class and Direction for Foreign Tanker Passages in Area 3 (2003)

DWT Class	Downbound	Upbound	Total
< 10 000	8	7	15
10 - 19 999	44	38	82
20 - 29 999	21	15	36
30 - 39 999	9	9	18
40 - 49 999	27	20	47
50 - 59 999	4	4	8
60 - 69 999	22	15	37
70 - 79 999	4	1	5
130 - 139 999	11	11	22
140 - 149 999	55	56	111
150 - 159 999	7	7	14
160 - 169 999	1	1	2
Total	**213**	**184**	**397**

All chemical carriers passed through Area 3. Passenger vessel passages in Area 3 are mainly destined to Quebec with a few going to other ports such as Rimouski. Close to 60% of the passages made by foreign ro-ro vessels were destined to or originated from the ports in Area 3. Table 1-32, Table 1-33 and Table 1-34 present the data pertaining to these vessel types.

Table 1-32
DWT Class and Direction for Foreign Chemical Carrier Passages in Area 3 (2003)

DWT Class	Downbound	Upbound	Total
< 10 000	15	14	29
10 - 19 999	53	35	88
20 - 29 999	9	4	13
30 - 39 999	16	16	32
40 - 49 999	21	21	42
Total	**114**	**90**	**204**

Table 1-33
DWT Class and Direction for Foreign Passenger Vessel Passages in Area 3 (2003)

DWT Class	Downbound	Upbound	Total
< 10 000	38	35	73
10 - 19 999	1	1	2
60 - 69 999	2	2	4
Total	**41**	**38**	**79**

Table 1-34
DWT Class and Direction for Foreign Ro-Ro Passages in Area 3 (2003)

DWT Class	Downbound	Upbound	Total
< 10 000	18	13	31
10 - 19 999	20	10	30
Total	**38**	**23**	**61**

1.4.2 Coastal Commercial Traffic

A total of 8,864 domestic vessel passages were recorded in Area 3 in 2003. Tug traffic consists mainly of activities in the ports of Sept-Îles and Baie-Comeau. Passenger vessel traffic is the same as that in Area 2 and goes directly through Area 3 except for the *CTMA Voyageur* (replaced by the *CTMA Vacancier*), which stops in Matane during winter. Containership passages are made by the *Cicero* while the ro-ro passages were made by the *Cabot* and the *Aivik*. The *Cabot* has a DW of 10,926 tonnes and the *Aivik*'s 4,860 tonnes. Table 1-35 presents the direction and types of domestic vessels passing in Area 3. The domestic chemical carriers are all in the 10 to 19,999 DWT range and were described in section 1.3.2. Finally, domestic general cargo passages follow the same pattern as that in Area 2.

Table 1-35
Direction and Type of Domestic Vessel Passages in Area 3 (2003)

Type / Direction	Downbound	Upbound	None	Total
Ferry	2 099	2 059	11	4 169
Tug	262	260	1 194	1 716
Dry bulk	665	565	10	1 240
Special purpose	272	293	113	678
Passenger	67	62	102	231
Tanker	114	102	2	218
Ro-ro	53	51	44	148
General cargo	58	62		120
Container	56	55		111
Chemical	59	51		110
Barge	8	11	41	60
Fishing	6	5	12	23
Military	9	10		19
Yacht	6	6		12
Hovercraft	2	2		4
OBO	1	1		2
Dredge	1		1	2
Hydrofoil	1			1
Total	**3 739**	**3 595**	**1 530**	**8 864**

The domestic dry bulk fleet passing in Area 3 is the same as the one passing in Area 2. Approximately 90% of these trips were either destined to or originated from Sept-Îles, Port-Cartier or Baie-Comeau. The reason for such a high percentage is that many bulkers come down the St. Lawrence to unload grain in Baie-Comeau, then go on to Sept-Îles or Port-

Cartier to load iron and then go back up the river. Table 1-36 presents the direction and DWT class for domestic bulkers passing in Area 3.

Table 1-36
DWT Class and Direction for Domestic Bulker Passages in Area 3 (2003)

DWT Class	Downbound	Upbound	None	Total
10 - 19 999	3	4		7
20 - 29 999	265	207	4	476
30 - 39 999	355	311	6	672
50 - 59 999	41	41		82
70 - 79 999	1	2		3
Total	**665**	**565**	**10**	**1 240**

Domestic tanker passages in Area 3 are made by the same fleet as that reported in Area 2. The same traffic patterns and trades also apply. Table 1-37 presents the information on these domestic tankers.

Table 1-37
DWT Class and Direction for Domestic Tanker Passages in Area 3 (2003)

DWT Class	Downbound	Upbound	None	Total
< 10 000	25	24	1	50
10 - 19 999	79	67		146
30 - 39 999	10	11	1	22
Total	**114**	**102**	**2**	**218**

1.4.3 Recreational Boating and Sailing Activities

In Area 3 there are 7 marinas having a total of 548 spaces for recreational boats. Table 1-38 presents these marinas in terms of their number of seasonal or visitor spaces. In area 3, it is noted that commercial vessels may occasionally encounter sea kayakers, mainly in the Les Escoumins region, but, on occasion, some kayakers cross the St. Lawrence from north to south as far down as Forestville. In summer, the Les Escoumins region also has regular yachting activities, mainly for whale watching. Finally, the MCTS reported 51 yacht passages in 2003.

Table 1-38
Area 3 Marinas

Marina	Seasonal	Visitors
Le Bic	27	5
Rimouski	80	25
Trois-Pistoles	42	5
Matane	95	45
Rivière-Porneuf	20	10
Baie-Comeau	56	8
Sept-Îles	120	10
Total	**440**	**108**

1.4.4 Ferry Routes and Schedules

There are five regular ferry services passing through Area 3. The Matane to Baie-Comeau and Godbout ferry crosses on a regular basis year round. In spring and autumn, the *Camille-Marcoux* crosses twice daily from Matane. Except for Wednesday where the reverse situation applies, the first crossing in the morning is made towards Godbout and the second in the afternoon is made towards Baie-Comeau. During summer, up to four crossings per day are made from Matane and a second vessel, the *Felix-Antoine-Savard* supports the *Camille-Marcoux*. During winter, the same schedule as spring and autumn applies except on Tuesdays, Thursdays and Saturdays where there is only one crossing. The rail-ferry *Georges-Alexandre-Lebel* generally crosses the St Lawrence three times per day between Matane and Baie-Comeau. The *CNM Evolution* crosses from Rimouski to Forestville from the end of April to mid-October. This fast-ferry sails at 30 knots. In the high season (end of June to end of August), it crosses 4 times per day. The ferry progressively passes from 2 to 4 crossings in spring and from 4 to 2 crossings in autumn. Rimouski is also the departure point for the *Nordik Express* that first goes to Sept-Îles for later on going to the Lower North Shore Region. The *Héritage No I* usually crosses from Trois-Pistoles to Les Escoumins from mid-May to mid-October but its activities should cease in 2005. During the high season, the vessel used to make up to three crossings per day from Trois-Pistoles. Finally, the *La Richardière* crosses from l'Isle-Verte (village) to Notre-Dame-des-Sept-Douleurs on the south shore of l'Isle Verte (island). The vessel crosses during summer according to tidal variations. Table 1-39 presents the recorded ferry passages in Area 3 during 2003.

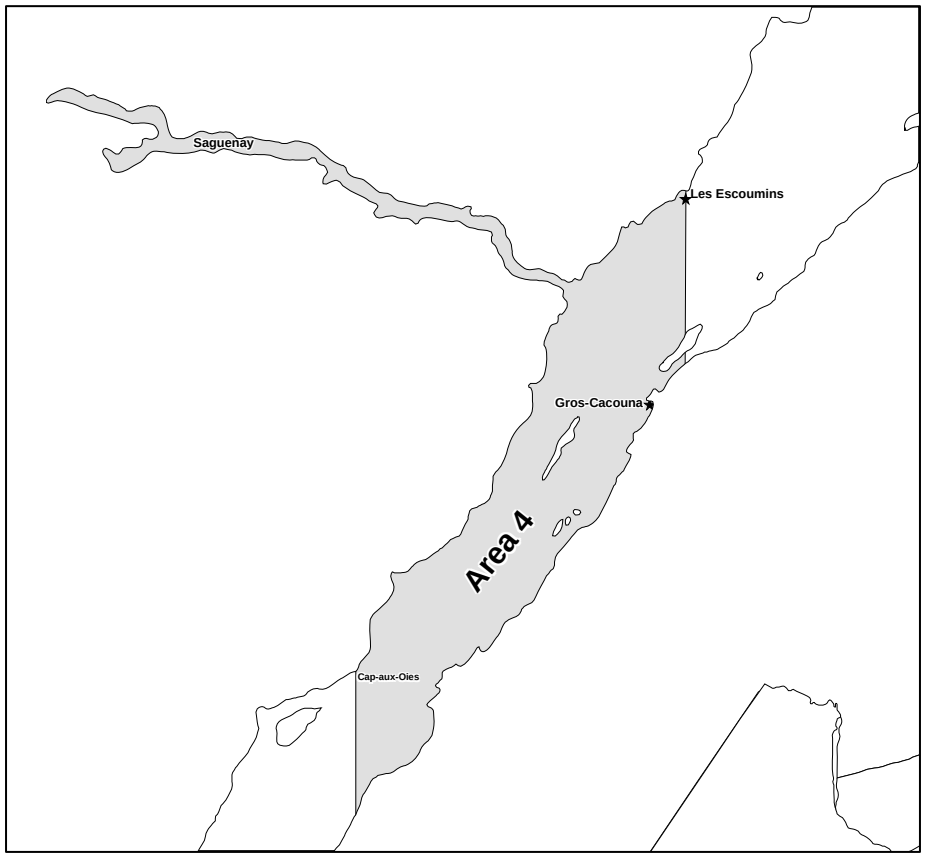
Table 1-39
Ferry Traffic in Area 3(2003)

Name	Downbound	Upbound	None	Total
CAMILLE MARCOUX	753	752	2	1 507
CNM EVOLUTION	490	488	9	987
GEORGES ALEXANDRE LEBEL	437	437		874
HERITAGE NO 1	297	296		593
NORDIK EXPRESS	78	43		121
FELIX ANTOINE SAVARD	42	42		84
JOSEPH SAVARD	1	1		2
LA RICHARDIERE	1			1
Total	**2 099**	**2 059**	**11**	**4 169**

1.5 AREA 4: CAP-AUX-OIES TO LES ESCOUMINS

Area 4, as shown in Figure 1-4, is delimited by a north to south line passing at Cap-aux-Oies (70°14'W) and by another north to south line at Les Escoumins (69°25'W). The traffic described in Area 4 includes trips having an origin or a destination in the Saguenay River. The traffic in this area is very similar to that in Area 3 because there are few ports where cargo is transhipped. Specifically, there are port activities in Gros-Cacouna, Pointe-au-Pic and Port Saguenay. The following map illustrates Area 4.

Figure 1-4
Area 4, Cap-aux-Oies to Les Escoumins



1.5.1 Deep Sea Commercial Traffic

There were 2,964 deep sea commercial passages in Area 4 in 2003. As stated earlier, most of this traffic is very similar to that in Area 3 and consists of passages having an origin or a destination mainly upstream of the area and in the Saguenay River. Table 1-40 presents this traffic according to the vessel type and the direction of those passages.

Table 1-40
Direction and Type of Foreign Vessel Passages in Area 4 (2003)

Type	Downbound	Upbound	None	Total
Dry bulk	609	514	1	1 124
Container	307	305		612
General cargo	258	218		476
Tanker	192	175		367
Chemical	114	90		204
Passenger	44	43	1	88
Ro-ro	22	19		41
Yacht	18	18		36
Tug	4	2		6
Special purpose	4	2		6
LNG	1	1		2
Dredge	1			1
OBO	1			1
Total	**1 575**	**1 387**	**2**	**2 964**

The passages reported as being made by a LNG vessel were made by the *Berge Rachel,* an LPG vessel that went up the St Lawrence to Quebec and Montreal.

Most of the dry bulk vessel passages are effectively just passing in the Area. Approximately 14% of these passages had an origin or a destination in the Saguenay (Port Alfred). Only a few passages were destined specifically in the region at Gros-Cacouna. Table 1-41 presents the passages of foreign dry bulk vessels in Area 4 in 2003. Passages in the DW ranges over 100,000 tonnes are all destined to or originated from Québec.

Table 1-41
DWT Class and Direction for Foreign Dry Bulk Passages in Area 4 (2003)

DWT Class	Downbound	Upbound	None	Total
< 10 000	10	9		19
10 - 19 999	67	50		117
20 - 29 999	199	172		371
30 - 39 999	198	162		360
40 - 49 999	33	22		55
50 - 59 999	15	10		25
60 - 69 999	24	21		45
70 - 79 999	57	62	1	120
120 - 129 999	1	1		2
130 - 139 999	3	3		6
140 - 149 999	1	1		2
160 - 169 999	1	1		2
Total	**609**	**514**	**1**	**1 124**

Table 1-42 presents containership passages that predominantly originated from, or was destined for, Montreal.

Table 1-42
DWT Class and Direction for Foreign Containership Passages in Area 4 (2003)

DWT Class	Downbound	Upbound	Total
< 10 000	5	4	9
10 - 19 999	53	52	105
20 - 29 999	1	1	2
30 - 39 999	153	154	307
40 - 49 999	95	94	189
Total	**307**	**305**	**612**

Amongst foreign registered vessels, general cargo ships are the ones most likely to transit to a port within Area 4. In this respect, about 28% of the passages presented in Table 1-43 either originated from or were destined for Area 4.

Table 1-43
DWT Class and Direction for Foreign General Cargo Passages in Area 4 (2003)

DWT Class	Downbound	Upbound	Total
< 10 000	136	117	253
10 - 19 999	88	70	158
20 - 29 999	19	17	36
30 - 39 999	14	13	27
50 - 59 999	1	1	2
Total	**258**	**218**	**476**

Except on rare occasions, foreign tankers and chemical carriers passing through Area 4 do not have an origin or a destination in the Area. Table 1-44 presents these passages.

Table 1-44
DWT Class and Direction for Foreign Tankers Passages in Area 4 (2003)

DWT Class	Downbound	Upbound	Total
< 10 000	8	7	15
10 - 19 999	34	31	65
20 - 29 999	19	15	34
30 - 39 999	9	9	18
40 - 49 999	25	18	43
50 - 59 999	4	4	8
60 - 69 999	16	13	29
70 - 79 999	2	1	3
130 - 139 999	12	12	24
140 - 149 999	55	57	112
150 - 159 999	7	7	14
160 - 169 999	1	1	2
Total	**192**	**175**	**367**

Table 1-45
DWT Class and Direction for Foreign Chemical Carriers Passages in Area 4 (2003)

DWT Class	Downbound	Upbound	Total
< 10 000	15	14	29
10 - 19 999	53	35	88
20 - 29 999	9	4	13
30 - 39 999	16	16	32
40 - 49 999	21	21	42
Total	**114**	**90**	**204**

Foreign passenger vessels in Area 4 have a predictable itinerary. Generally, they go up to Québec and, occasionally, they will sail up the Saguenay. Table 1-46 presents the data for foreign passenger vessels.

Table 1-46
DWT Class and Direction for Foreign Passenger Vessel Passages in Area 4 (2003)

DWT Class	Downbound	Upbound	None	Total
< 10 000	41	40	1	82
10 - 19 999	1	1		2
60 - 69 999	2	2		4
Total	**44**	**43**	**1**	**88**

Of the 41 passages made by foreign ro-ro vessels, more than half were either destined to or originated from Gros-Cacouna or Pointe-au-Pic in Area 4. Table 1-47 presents these trips according to their DWT class in 2003.

Table 1-47
DWT Class and Direction for Foreign Ro-Ro Vessel Passages in Area 4 (2003)

DWT Class	Downbound	Upbound	Total
< 10 000	10	10	20
10 - 19 999	12	9	21
Total	**22**	**19**	**41**

1.5.2 Coastal Commercial Traffic

Table 1-48 presents the 3,138 passages made by Canadian registered vessels in Area 4 according to their type and DWT class. The vessels making these passages are the same as those presented in areas 1 to 3. Most of these vessels are only passing through the Area. It is nonetheless useful to mention that passages of Canadian vessels having an origin or a destination in the Area are made by special purpose vessels, general cargo, ro-ro and general cargo vessels servicing the Arctic and tug & barge units unloading timber. There is also an important whale watching industry in the Area. During summer, these passenger

ships, which do not necessarily report all their movements to MCTS, leave Tadoussac, Baie-Sainte-Catherine, Grande-Bergeronnes and Les Escoumins for whale watching tours. Generally, each vessel (or zodiac) goes out for their activities three times per day for three hour tours during the high season. In 1997, it was estimated that the number of tours in the Tadoussac region was over 7,500. These excursions were made by 31 small boats and by 17 larger sized vessels[5]. Military is spelled incorrectly in the following table

Table 1-48
Type, DWT Class and Direction of Canadian Vessel Passages in Area 4 (2003)

Type DWT Class	Downbound	Upbound	None	Total
Ferry				
< 10 000	39	37	274	350
Dry bulk				
10 - 19 999	2	5		7
20 - 29 999	192	191		383
30 - 39 999	265	266		531
50 - 59 999	41	41	1	83
Passenger				
< 10 000	130	140	392	662
Special purpose				
< 10 000	128	118	98	344
Tug				
< 10 000	99	92	1	192
Tanker				
< 10 000	23	23		46
10 - 19 999	53	51		104
30 - 39 999	1	1		2
Container				
< 10 000	56	55		111
General cargo				
< 10 000	37	38		75
10 - 19 999	5	3		8
Ro-Ro				
< 10 000	3	3		6
10 - 19 999	44	45		89
Chemical				
10 - 19 999	40	38		78
Barge				
< 10 000	6	3	22	31
Fishing				
< 10 000	7	1		8
Yacht				
< 10 000	4	1	4	9
Military				
< 10 000	6	6		12
Hovercraft				
< 10 000	1	1		2
Hydrofoil				
< 10 000	1	1		2
OBO				
20 - 29 999	1	1		2
Dredge				
< 10 000	1			1
Total	**1 185**	**1 161**	**792**	**3 138**

[5] Michaud *et al.* 1997.

1.5.3 Recreational Boating and Sailing Activities

Recreational boating and sailing activities in Area 4 are more intense than in other areas analysed due to the proximity of Québec, calmer waters and the attractiveness of marine mammals. The Department of Fisheries and Oceans reports that in 1997, from 15,000 to 16,000 pleasure craft movements were made in St. Lawrence Saguenay Marine Park[6]. The high season is from mid-June to the beginning of September. Also, the same source states that approximately 15,000 kayak days were recorded in Area 4. Kayaks mainly stay near the coast but intense kayak activity during summer is reported in the Grandes-Bergeronnes and Saguenay sectors. These kayaks frequently go further in the river for marine mammal observation. The MCTS reports 51 yacht movements (Canadian and foreign) in Area 4 in 2003. Table 1-49 presents the marinas and number of places for pleasure boats in Area 4.

Table 1-49
Marinas Located in Area 4

Marina	Seasonnal	Visitor
Sacré-Cœur	15	2
Anse St-Jean	40	10
Rivière-du-Loup	65	20
Tadoussac	90	50
Grandes-Bergeronnes	35	20
Saint-Jean-Port-Joli	51	18
Total	**296**	**120**

1.5.4 Ferry Routes and Schedules

There are 2 ferry services in Area 4. The *Trans-St-Laurent* sails from Rivière-du-Loup to Saint-Siméon from the beginning of April to the beginning of January. The vessel can make up to 5 crossings per day leaving Rivière-du-Loup during the peak season and only 2 in the low season. The other ferry service in Area 4 is between Tadoussac and Baie-Sainte-Catherine. In the peak season, two vessels depart each end of the link every 20 minutes during daytime. At night, there is one crossing every 40 minutes from Tadoussac. During the low season, more or less the same schedule applies except that there are fewer crossings during the weekend. The MCTS reports 334 passages by the *Trans-St-Laurent* in 2003.

1.6 AREA 5: ESCOUMINS TO GROS CACOUNA

In the Area from Les Escoumins to Cros-Cacouna, all passages having an origin or a destination in Gros-Cacouna were selected. This includes vessels that anchored off the port of Gros-Cacouna without entering it. Unless they do not have the required dimensions, all commercial vessels, Canadian or not, entering the port of Gros-Cacouna are subject to pilotage. Vessels coming down the St Lawrence will enter the port with the pilot taken on-board at origin while the ones going upstream will first go to Les Escoumins to pick-up a pilot and then cross the river to Gros-Cacouna.

[6] DFO, 2002.

1.6.1 Deep Sea Commercial Traffic

A total of 60 passages made by foreign registered vessels were recorded as having an origin or a destination in Gros-Cacouna in 2003. Table 1-50 presents the direction, type and DWT class of these passages.

Table 1-50
Type, DWT & Direction for Foreign Vessel Passages - Gros-Cacouna (2003)

Type / DWT Class	Downbound	Upbound	Total
Dry bulk			
10 - 19 999	1	2	3
20 - 29 999	9	11	20
30 - 39 999	5	1	6
40 - 49 999		2	2
General cargo			
< 10 000	13	2	15
10 - 19 999	4	2	6
Ro-ro			
< 10 000	2	2	4
10 - 19 999	1	3	4
Total	**35**	**25**	**60**

1.6.2 Coastal Commercial Traffic

Table 1-51 presents Canadian vessel passages to and from Gros-Cacouna. Most of the tug movements were reported as being made between Port-Menier on Anticosti Island and Gros-Cacouna. These tugs push or pull barges loaded with timber. The number of tug movements is considerably larger than barge movements because tugs do not stay in port while cargo is being transhipped from barges. Special purpose vessel passages were made mainly by icebreakers.

Table 1-51
Type, DWT & Direction for Canadian Vessel Passages - Gros-Cacouna (2003)

Type	DWT Class	Downbound	Upbound	None	Total
Tug	< 10 000	40	35	1	76
Special purpose	< 10 000	24	28	2	54
Barge	< 10 000	3	1	21	25
Passenger	< 10 000	2	2		4
Dry bulk	20 - 29 999	1	2		3
Hydrofoil	< 10 000	1	1		2
Ferry	< 10 000	1	1		2
	Total	**72**	**70**	**24**	**166**

1.6.3 Recreational Boating and Sailing Activities

Recreational boating and sailing activities between Gros-Cacouna and Escoumins are limited. Nonetheless there exists some traffic between the North shore of the St Lawrence and the marinas located in Rivière-du-Loup and in Trois-Pistoles. During summer, the Gros-Cacouna region is also used by kayakers. In 2005, it is projected that 6 locations between l'Isle Verte and Rivière-du-Loup will be selected as landing grounds for kayakers touring on the *Route Bleu du sud de l'Estuaire.* This maritime "trail" is projected to go from Berthier-sur-Mer to Sainte-Luce and will thus pass in front of Gros-Cacouna. For now, the precise coordinates of the landing grounds between Rivière-du-Loup and l'Isle-Verte are not public. It is expected that this will be done early in 2005.

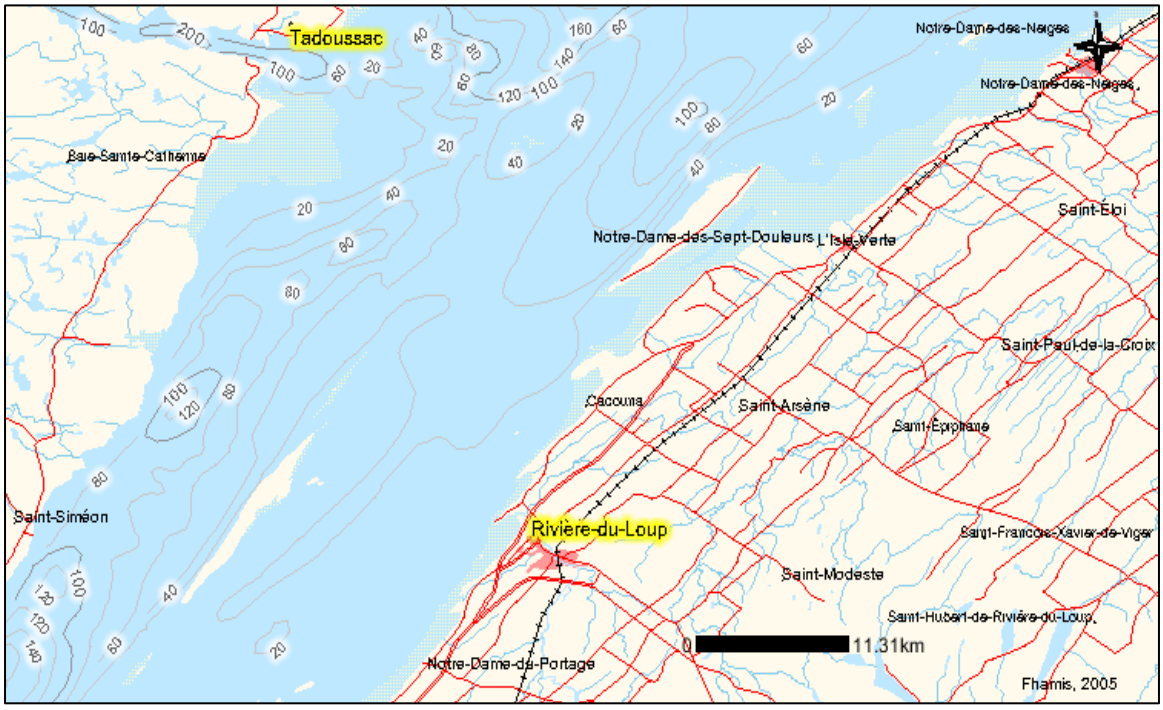
2 Fishery Resources

2.1 FISH HABITAT AND SENSITIVE MARINE AREAS

Species located in proximity to the future liquefied natural gas facility in Gros-Cacouna are listed in

Table 2-1. Species were identified from DFO's Fish habitat management information system database (FHAMIS).This system provides information on resources, habitats and human factors for the entire marine part of the Saint Lawrence and along the marine shores of Northern Quebec. The following figure illustrates the geographical zone considered for the identification of the species.

Figure 2-1
Gros-Cacouna Area Fish Habitat



Source: Fisheries and Oceans Canada's FHAMIS (2004)

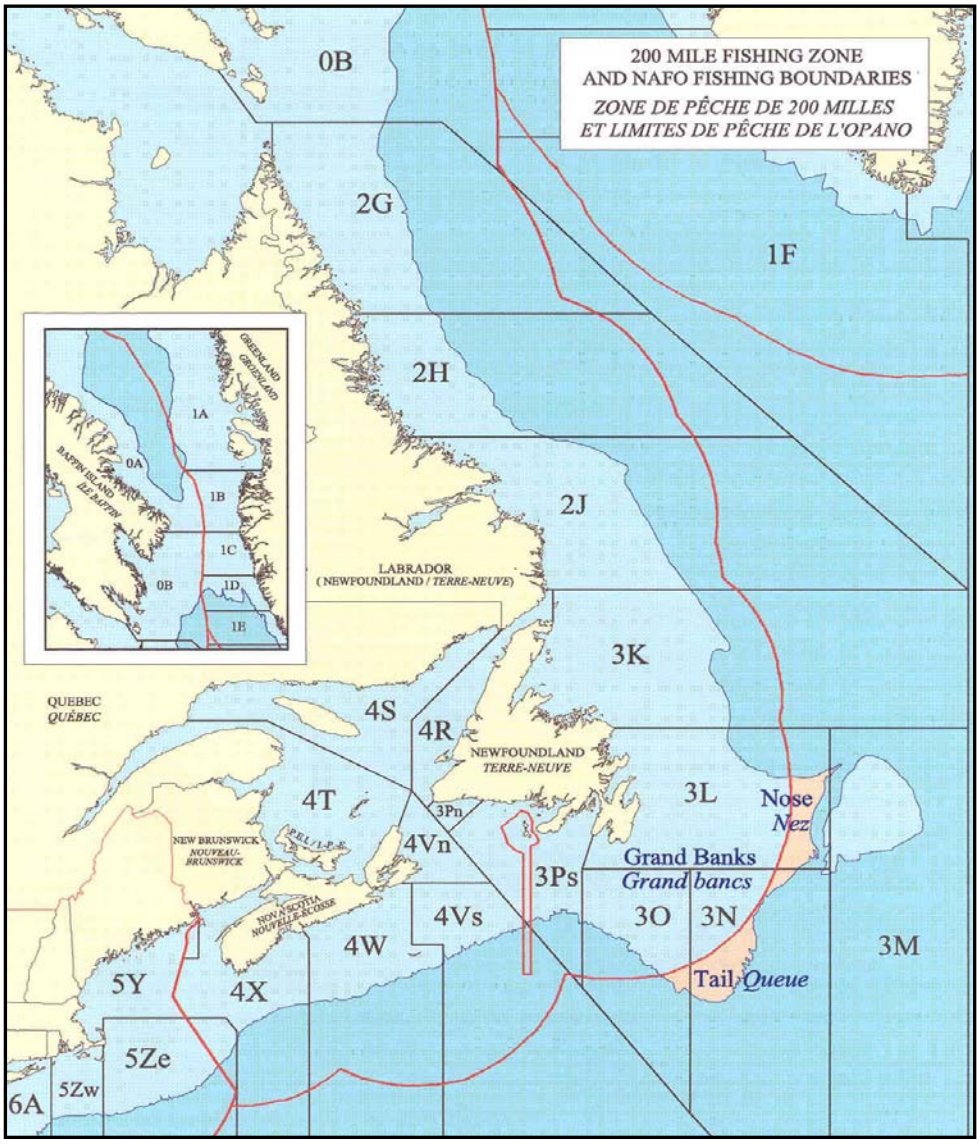
Table 2-1
Aquatic resources located in proximity of Gros-Cacouna

Resource	Specie	Activity	Period
Aquatic vegetation			
	Algae	Presence	Non specified
	Marsh	Presence	Non specified
	Seagrass	Presence	Non specified
Invertebrate			
	Blue mussel	Unharvested	Annual
	Green sea urchin	Harvested	Spring-Summer-Fall
	Pink shrimp	Presence	Spring-Summer-Fall
	Rock crab	Presence	Annual
	Snow crab	Presence	Spring-Summer-Fall
	Soft-shelled clam	Unharvested	Annual
	Stimpson's surf clam	Unharvested	Annual
Fishes			
	American eel	Harvested	Spring-Summer-Fall
	American plaice	Present	Spring-Summer-Fall
	American shad	Present	Spring-Summer-Fall
	Atlantic cod	Harvested	Spring-Summer-Fall
	Atlantic herring	Harvested	Spring-Summer-Fall
	Atlantic sturgeon	Harvested	Spring-Summer-Fall
	Atlantic tomcod	Harvested	Summer
	Blackspotted stickleback	Spawning	Spring-Summer-Fall
	Brook trout	Unharvested	Spring-Summer-Fall
	Capelin	Harvested	Spring-Summer-Fall
	Deepwater redfish	Harvested	Spring-Summer-Fall
	Greenland halibut	Harvested	Spring-Summer-Fall
	Rainbow smelt	Harvested	Spring-Summer-Fall**
	Threespine stickleback	Spawning	Spring-Summer-Fall
Mammals			
	Beluga	Unharvested	Summer*
	Blue whale	Unharvested	Spring-Summer-Fall**
	Fin whale	Unharvested	Spring-Summer-Fall
	Grey seal	Potential haul-out	Summer
	Harbor seal	Whelping area	Spring**
	Harp seal	Harvested	Winter
	Humpback whale	Unharvested	Spring-Summer-Fall
	Minke whale	Unharvested	Spring-Summer-Fall

*some places annual ** some places winter
Source: Maritime Innovation adapted from FHAMIS (2004)

This section also identifies the aquatic resources' habitat (not just strictly fish but marine mammals and benthic animals as well) that the LNG carrier will pass through or by on route to the LNG facility at Gros-Cacouna. Some species habitat locations are identified in terms of the Northwest Atlantic Fisheries Organization's (NAFO) fishing zones, as shown on Figure 2-2. Fishing zones maps have been obtained from the Canadian Advisory Secretariat (CSAS) web site of Fisheries and Oceans Canada.

Figure 2-2
Mile Fishing Zone and NAFO Fishing Boundaries

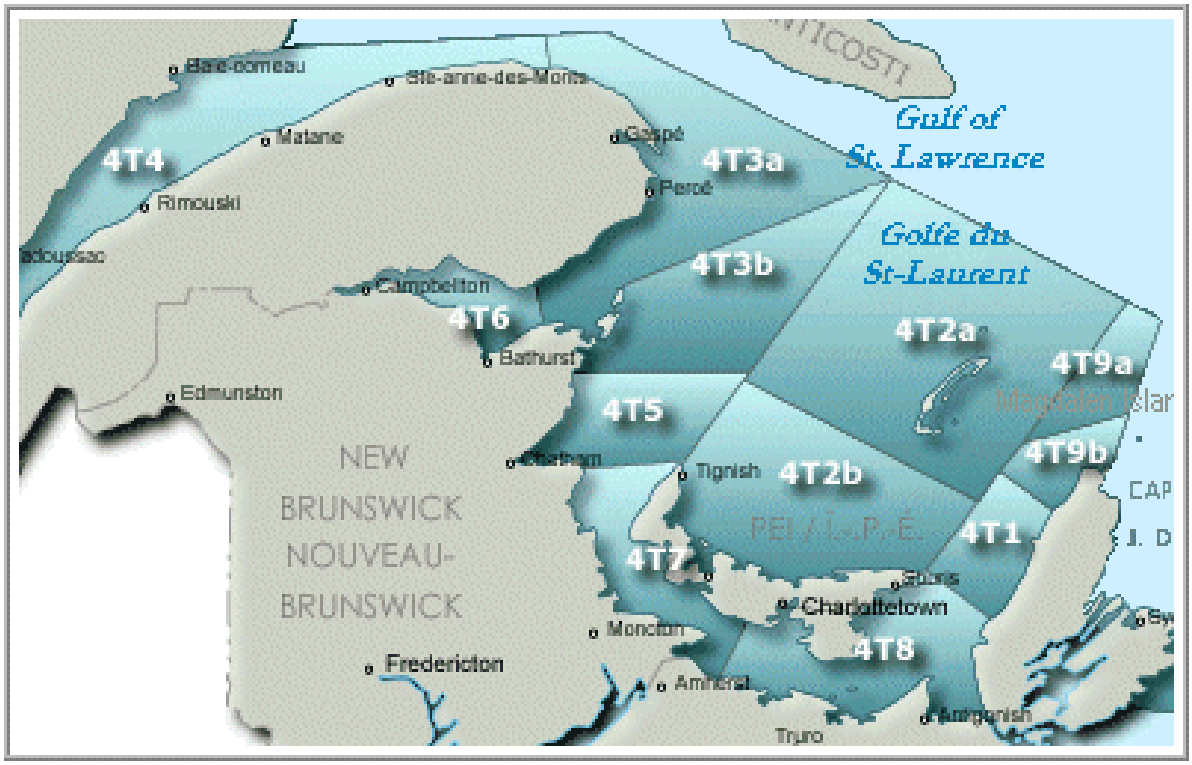


Source: Fisheries and Oceans Canada's CSAS (2004)

2.1.1 Groundfish

Groundfish generally feed and dwell near the bottom of the sea. Warm waters of the northerly Gulf Stream mingling with the frigid Labrador Current create conditions particularly conducive to sustaining large populations of cod, flatfish, haddock and other groundfish species. Figure 2-3 shows the sensitive groundfish fishing zones in the Gulf of St. Lawrence.

Figure 2-3
Sensitive Groundfish fishing zones



Source: (2004)

Atlantic cod
The Atlantic cod has been the dominant commercial species of the Northwest Atlantic. The inshore fishery traditionally has used a variety of gear such as cod traps, linetrawls, longline, gillnet, handline, and jigger. The offshore banks fishery by schooners traditionally used linetrawls set out and hauled by men in dories on the coastal and offshore banks. In the Northwest Atlantic, the Atlantic cod thrives from inshore shallow water, about 5 m depth, to the edge of the continental shelf, in water as deep as 600 m. On the Canadian side of the Davis Strait, cod stocks do not extend as far north as west Greenland. The northern limit is off Frobisher Bay and extends into Ungava Bay. They become more abundant along the

Labrador coast and off Newfoundland, distributed on the Flemish Cap, Grand Banks, Gulf of St. Lawrence, Nova Scotian Shelf, Gulf of Maine, and as far south as Cape Hatteras.

Cod Stocks in the Northwest Atlantic area are:

- Northern Labrador (NAFO Divisions 2G+2H);
- Southern Labrador-Eastern Newfoundland (NAFO Divisions 2J+3K+3L);
- Southern Grand Bank (NAFO Divisions 3N+30);
- Flemish Cap (NAFO Division 3M);
- St. Pierre Bank (NAFO Division 3Ps)
- Northern Gulf of St. Lawrence (NAFO Division 4R+4S+3Pn);
- Southern Gulf of Saint Laurent (NAFO Division.4T+4Vn);
- Northern Scotia Shelf (NAFO Division 4Vs+ 4W);
- Southern Scotia Shelf (NAFO Division 4X);
- Gulf of Maine (NAFO Division. 5Y) Georges Bank (NAFO Divison 5Z).

Haddock (Melanogrammus aeglefinus)

The remaining fishery areas are located on the Scotian Shelf, the Bay of Fundy and the Gulf of Maine. Haddock range from the Strait of Belle Isle to Cape Cod. In Canadian waters, they are found mainly on the continental shelf from the Bay of Fundy to the east coast of Cape Breton, and eastwards to the Grand Banks, most commonly in depths of 45 to 240 m. Haddock are caught with otter trawls but other gear such as longlines and gillnets are also used.

Pollock (Pollachius virens)

Pollock range from southern Labrador to Cape Cod, but are fished primarily in coastal waters and on the offshore banks of the Scotian Shelf, Bay of Fundy and Gulf of Maine. Pollock are caught with otter trawls but other gear such as longlines and gillnets are also used.

Silver hake (Merluccius bilinearis)

Silver hake are mainly found on Georges Bank and on the Nova Scotia Banks, particularly on Browns Bank and the Sable Island Banks in depths of 55 to 275 m. Silver hake is formerly under-exploited by the Canadian fisheries and harvested mainly by fleets of other nations.

White hake (Urophycis tenuis)

White hake are restricted in distribution to the western Atlantic Ocean from the Gulf of St. Lawrence and the southern part of the Grand Banks of Newfoundland southward to Cape Hatteras. Areas of greatest abundance are the southern Gulf of St. Lawrence, the Scotian Shelf and the southwest slope of the Grand Banks. Most of the catch is taken in Subarea 4, which includes the Gulf of St. Lawrence and the Scotian Shelf. Within this area, the largest catches are obtained in the southern Gulf of St. Lawrence and the southern Scotian Shelf.

Redfish (Sebastes sp.)

Redfish usually inhabit waters from 100 to 700 m in depth in the Gulf of Maine, off the Nova Scotia and Newfoundland banks, in the Gulf of St. Lawrence, along the continental slope from the southwestern Grand Banks to Hamilton Inlet Bank, and in the area of Flemish Cap. They are also known off the southern coast of Baffin Island and off West Greenland, but they occur there in less abundance. Occasionally, in some areas of Maine, Newfoundland and the Bay of Fundy, where the waters are very cool, redfish have been caught in shallow waters near shore and around wharves. Redfish are caught primarily by midwater trawls but may also be fished with bottom otter trawls. The resource is divided into seven separate stocks, each of which is managed separately. Since 1974, all of these stocks have been regulated by a Total Allowable Catch (TAC), which sets the upper exploitable limit for each stock.

American plaice *(Hippoglossoides* platessoides)

American plaice (sometimes called plaice or flounder) is probably the most abundant flatfish in the Northwest Atlantic and has become one of the major commercially exploited groundfish species. In general, they are harvested in both inshore and offshore fisheries, mainly with otter trawls, although seine nets and longlines are also used. For Canada, the most important fishery for plaice is the Grand Banks, where it has accounted for up to two thirds of the total Newfoundland trawler landings in the past decade. American plaice are also fished commercially in other localities and the species is common throughout the whole North West Atlantic. For management purposes, American plaice in the Canadian sector of the Northwest Atlantic consists of six stocks. Additionally, there is a stock in the New England-George's Bank area.

The stocks of American plaice in the Canadian Northern Atlantic are as follows:

- Subarea 2 (NAFO Div. 2G, 2H, 2J);
- NAFO Division 3K (Labrador, northeast Newfoundland);
- Grand Banks (NAFO Division 3L, 3N and 30);
- Flemish (NAFO Cap Division 3M);
- St. Pierre Bank (NAFO Subdivision 3Ps);
- Southern Gulf of St. Lawrence (NAFO Division 4T);
- Scotian Shelf (NAFO Divisions 4V, 4W, and 4X);
- Georges Banks-New England (NAFO Subareas 5 and 6).

Atlantic halibut (Hippoglossus hippoglossus)

While halibut is now the most highly prized flatfish in the northwest Atlantic, present day longliners are equipped with machinery which reduces the amount of labour involved in setting and hauling. Most halibut are found with notable concentrations occurring along the edges of Georges Bank, Sable Island Bank, Banquereau Bank, Grand Bank, the Flemish Cap, and Anticosti Island. Inshore concentrations are known to occur off Cape Sable Island (Nova Scotia), around Grand Manan Island in the mouth of the Bay of Fundy, and even in the Minas Basin at the head of the Bay of Fundy. They are caught with longlines and otter trawls.

Witch flounder (Glyptocephalus cynoglossus)

Although a large proportion of witch flounder is taken as a by-catch of other fisheries, it forms an important component of the Canadian Atlantic groundfish resource. They are harvested with otter trawls and seine nets. When the witch flounder fisheries came under international quota regulation in 1974, the fishery was divided into five different stock areas for management purposes, based upon the best biological advice at that time.

The five stock areas are:

- Southern Labrador-eastern Newfoundland (NAFO Div. 2J-3KL);
- Southern Grand Banks (NAFO Div. 3NO);
- St. Pierre Bank-Fortune Bay (NAFO Sub-div. 3Ps);
- Northern Gulf of St. Lawrence (NAFO Div. 4RS) ;
- Scotian Shelf (NAFO Div. 4VWX).

Yellowtail flounder (*Limanda ferruginea*)

Distribution in the Northwest Atlantic extends from the Strait of Belle Isle to Chesapeake Bay including the Gulf of St. Lawrence and the Grand Banks. Yellowtale is caught chiefly with otter trawls. There are two stocks recognized in Canadian waters for management purposes; the Grand Banks stock (NAFO Divs. 3NO) and the Scotian Shelf stock (NAFO Divs. 4VWX). However, the latter stock is managed in combination with the other flatfish species in this area, such as American plaice and witch flounder. There is, also, an important stock in the United States zone (NAFO Subareas 5 and 6).

Turbot or Greenland halibut (*Reinhardtius* hippoglossoides)

Turbot are found from Arctic waters south to Georges Bank. They occur in deep waters and the fishery is confined, for the most part, to the deep bays of Newfoundland, Labrador, Baffin Island and the Gulf of Saint Lawrence. Traditionally a line trawl fishery, gillnets are now being used to harvest these fish. Offshore catches are made by otter trawl. The Greenland in the Gulf of Saint Lawrence is considered to be a stock isolated from the main Northwest Atlantic population found to the east and north of Newfoundland's Grand bank. Greenland halibut are generally found in the channels of the Gulf of Saint Lawrence at depths channels of 130-500 m. The fishery is now made up of gillnetters with home ports in Quebec and the West Coast of Newfoundland.

Winter flounder (Pseudopleuronectes americanus)

Winter flounder range all along the North American coast in the inshore and nearshore waters from Labrador to Georgia. Nearshore fishermen harvest them with handlines, spears and trapnets while inshore fishermen use otter trawls and tangle nets.

2.1.2 Pelagic fish

Atlantic mackerel (*Scomber scombrus L.*)

The Atlantic mackerel is widely distributed throughout tropical and temperate waters around the world. Scombridae can travel long distances in tight schools, which can sometimes be very large. In the northwest Atlantic, the spatial distribution of the Atlantic

mackerel extends from Cape Hatteras, off North Carolina, to the Gulf of St. Lawrence and the east coast of Newfoundland (Figure 2-4). Within this region, there are also two separate spawning areas, located respectively along the New Jersey coast and in the southern Gulf of St. Lawrence (NAFO Division 4T).

Nova Scotia and Newfoundland are the Atlantic Provinces with the highest mean landings. The majority of landings are from the southern Gulf of St. Lawrence, more specifically NAFO division 4T where annual landings total 9,460 tons on average. Significant mackerel landings are also taken in divisions 4R, 4X and 4V, with annual averages of 3,625 t, 3,524 t, and 1,223 t, respectively. The main subdivisions or unit areas are 4Tl, on the east coast of New Brunswick, and 4Tf, in the Magdalen Islands. Landings in these subdivisions average 3,759 t and 3,224t per year, respectively. Area 4Xm near Halifax, Nova Scotia, has landings of 2 986t, followed by unit areas 4Rb and 4Rc on the west coast of Newfoundland, and subdivision 4Vn at the entrance of the Gulf of St. Lawrence, with average annual landings of 1,173t, 1,493t and 1,323t respectively. Today, the main gear used in the mackerel fishery are traps and gillnets in Nova Scotia, gillnets, handlines and purse seines in the Gulf of St. Lawrence and handlines and purse seines on the both coasts of Newfoundland. They are used near the shore and generally at the same locations.

Figure 2-4
Sensitive Atlantic Mackerel Fishing Areas

Source: (2004)

Swordfish

Harpooning for swordfish currently occurs primarily along the edges of Georges and Browns Banks, and targets mainly the large female swordfish swimming or "basking" in surface waters during the day. The Canadian large pelagic longline fishery extends from Georges Bank south of Nova Scotia to beyond the Flemish Cap east of Newfoundland when swordfish, the main species targeted, migrate into and adjacent to the Canadian Exclusive Economic Zone (EEZ). Longline fishing effort generally progresses from west to east and back again and from offshore to inshore along the edge of the continental shelf following swordfish movements associated with seasonal warming trends of surface water temperature, and a northward movement of the edge of the Gulf Stream. Swordfish migrate into the Canadian EEZ during summer and fall to feed in the productive waters of the continental shelf slope and shelf basins, areas where water temperatures form a distinct thermocline. The Canadian large pelagic longline fisheries which direct for, or incidentally catch swordfish, currently operate from May through November, and the harpoon fishery for swordfish primarily occurs from June through late August.

Atlantic salmon *(Salmo salar)*

The Atlantic salmon is native to the basin of the North Atlantic Ocean. In Canada, the Atlantic salmon occurs naturally throughout Newfoundland, Labrador, the Maritime Provinces, eastern Quebec and the Ungava region of northern Quebec. There are a number of landlocked populations throughout the distribution, especially in Newfoundland, Labrador and Quebec. The Atlantic salmon is world renowned both as

Atlantic Herring (Cluepea harengus harengus)

This is a pelagic fish that frequents cold Atlantic waters. It's distribution in Canada extends from the coasts of Nova Scotia to the coasts of Labrador. It travels in tight schools, spawning near the coast and wintering in open sea in deeper water. The same herring return to the same spawning, feeding and wintering sites year after year. In Canadian waters, herring are also harvested commercially, mainly southwest of Nova Scotia in the Bay of Fundy, in the southern Gulf of Saint Lawrence and on Quebec's North shore. Large herring catches are also made on the west coast of Newfoundland. The main gear use is the purse seine

Capelin (Mallotus villosus)

This is a small marine fish with a circumpolar distribution. In the eastern North America, capelin occurs along the coast of Labrador and Newfoundland, on the Grand Banks and in the Estuary and Gulf of Saint Lawrence. The capelin fishery is one of the most important species found in the Estuary and Gulf of Saint Lawrence. In this region the capelin fishing season is short and corresponds to the pre-spawning period in the seine fishery and the spawning period to the trap fishery. The largest landing for all Gulf are nearly always made on the west coast of Newfoundland (NAFO division 4R). In Divisions 4R and 4S, the most intensive fishing occurs in June and July. In division 4T the fishing season sometimes begins as early as April. Purse seines, traps, and weirs are mostly used to catch capelin in the Estuary.

The following species' habitat is the Great Lakes region, these species have been included in order to provide additional information and complete the list of species.

Brook trout (Salvelinus fontinalis)

The brook trout is a native North American fish species. In Canada, the brook trout is widely distributed throughout the Maritime Provinces, Newfoundland, Labrador, Quebec, the Great Lakes drainage basin in Ontario, and north to the James and Hudson Bays. The brook trout is one of the most popular game fishes in eastern Canada.

Channel catfish (Ictalurus punctatus)

The channel catfish is native to the fresh waters of eastern and central North America. In Canada, it occurs in the St. Lawrence River and its tributaries, in southern Quebec, the Ottawa River and tributaries, all the Great Lakes except Lake Superior, all of Ontario at the level of Lake Nipissing and the French River to Lake Superior, and in the Nelson River system of extreme western Ontario and Manitoba. The channel catfish is an important commercial fish in the Great Lakes and St. Lawrence River, a challenging sport fish and an excellent food fish.

Brown trout (*Salmo trutta*)

It was first introduced into Canadian waters in Quebec in 1890. The brown trout has become increasingly popular as a game fish since its introduction.

Lake sturgeon (Acipenser fulvescens)

The lake sturgeon is native to large rivers and lakes in North America. In Eastern Canada, it is found from the Great Lakes to the end of freshwater in the St. Lawrence River.

Muskellunge (Esox masquinongy)

The muskellunge is found in the fresh waters of eastern North America. In Canada, the muskellunge occurs in rivers and lakes from the Saint John River system in New Brunswick, through southern Quebec, the St. Lawrence and its north and south tributaries, throughout the lower Great Lakes and in Manitoba.

2.1.3 Invertebrates

Squid

Only the short-finned squid (*Illex illecebrosus*) has been of major commercial importance to the fishery in Atlantic Canada. This species is common throughout areas of the Maritimes and Newfoundland. Fishable concentrations are found from the Gulf of St. Lawrence and Newfoundland to Cape Hatteras. From April through June, young squid migrate from the Slope Water beyond the edge of the Continental Shelf onto the Grand Banks, the Scotian Shelf, Georges Bank and the mid-Atlantic Bight shelf area. The age of these squid is estimated at three to six months. In June, the greatest concentrations

occur along the edge of the Scotian Shelf, usually between Emerald and LaHave Banks and, in some years, along the entire edge of the Shelf. They also occur along the edge of Georges Bank and the southwestern edge of the Grand Banks. Through July, August and September, the distribution extends to cover large areas of the Continental Shelf and, in some years, to the Gulf of St. Lawrence. Figure 2-5 shows the sensitive squid fishing zones in the Gulf of St. Lawrence.

The long-finned squid (*Loligo pealiei*) is also found, but only in very low abundance, in Atlantic Canadian waters. It is occasionally caught over the southwestern areas of the Scotian Shelf and the Bay of Fundy, and more frequently on Georges Bank.

Figure 2-5
Sensitive Squid fishing zones

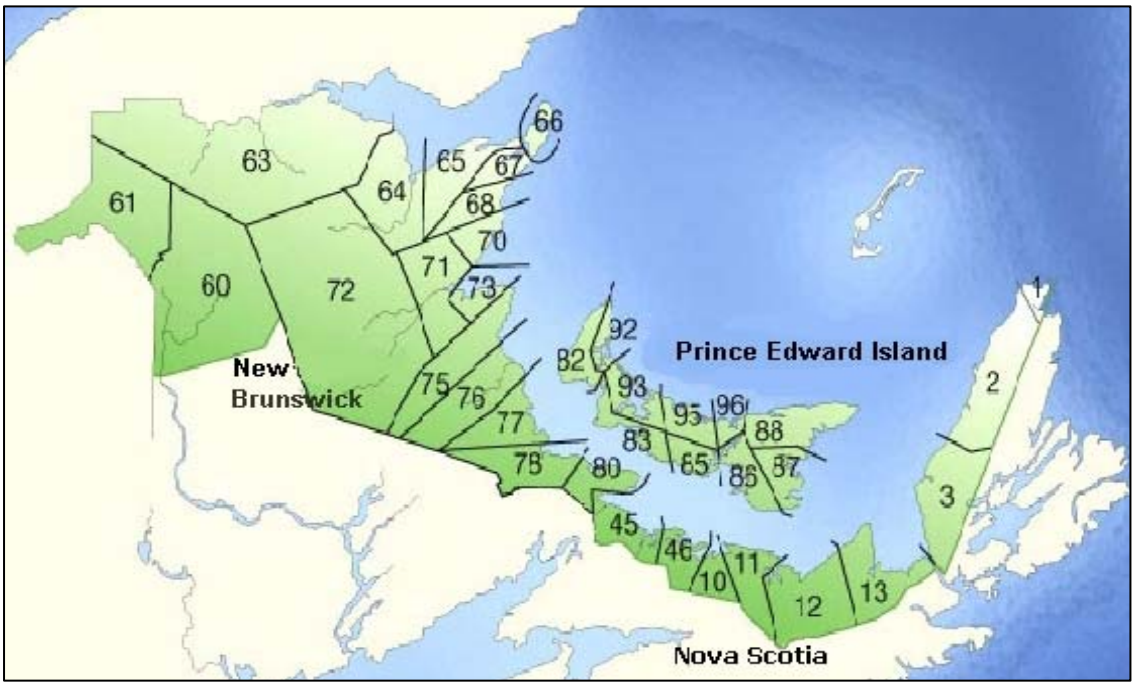
Source: (2004)

American oyster (Crassostrea virginica)

The American oyster (also called eastern oyster), is the commercial oyster of the Canadian Maritime Provinces. On the East Coast, there are very few commercial oysters along the Atlantic coast of Nova Scotia and none in the Bay of Fundy because water temperatures in those coastal areas, among other environmental factors, are generally too cold for oyster reproduction and growth. Excluding oyster beds in the coves of Cape Breton's Bras d'Or Lakes, oysters are mostly concentrated in the Gulf Region. They are found in the warm, shallow bays and estuaries of the southern and western parts of the Gulf of St. Lawrence and Northumberland Strait. Prince Edward Island is the leading

oyster-producing province followed by New Brunswick. The beds of Prince Edward Island's Malpeque Bay and Summerside Harbour, combined with those of Caraquet Bay in northern New Brunswick, account for about two-thirds of Canada's total east coast oyster harvest. Other important oyster growing areas include the bays and inlets of the Bras d'Or Lakes, New Brunswick's Miramichi Bay, and Prince Edward Island's Hillsborough and West Rivers. Figure 2-6 shows the American oyster fishing areas in the Gulf region.

Figure 2-6
American Oyster fishing areas in the Gulf region



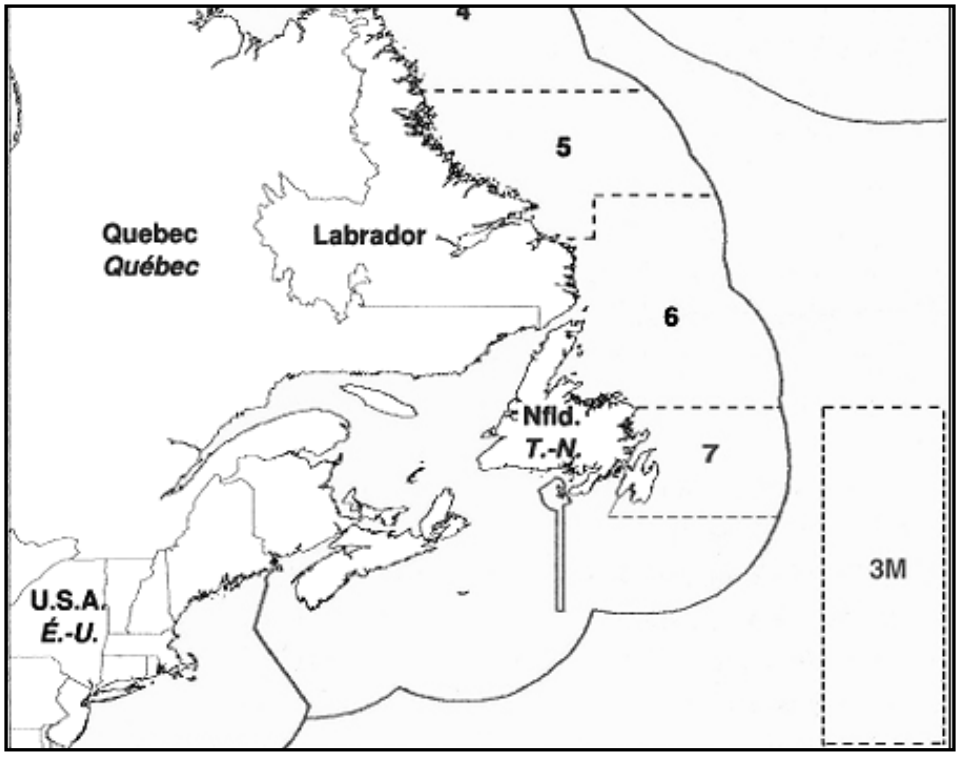
Source: (2004)

American oysters are harvested both from natural beds and from leased areas. Natural beds, not under lease, are a common property resource and anyone who purchases a licence is allowed to fish them. Most commercial and communal oyster licences (75%) in the Gulf Region are issued for fishing in approved areas (clean waters). Around 52% of commercial oyster licences (3,929) are issued in PEI, 43% in Eastern New Brunswick, and 5% in the Gulf of Nova Scotia. There are a number of privately held oyster leases in the Gulf Region averaging in sizes between 0.4 - 40 hectares (1-100 acres). Forty-seven percent of the Gulf Region's total leased areas (5,752 Ha) are located in PEI, 44% in Eastern New Brunswick, and 15% in the Gulf of Nova Scotia.

Northern shrimp (*Pandalus borealis*)

Shrimp fisheries in eastern Canada have shown rapid growth during the last decade and are now ranked fourth in value among shellfish species, behind lobster, scallops and crabs. The northern shrimp is the most commercially important of more than 30 shrimps found in the Canadian Northern Atlantic. Areas on the Canadian east coast where shrimp are harvested include the Gulf of St. Lawrence, Scotian Shelf, Labrador Channels and Davis Strait. Figure 2-7 shows the sensitive northern shrimp fishing zones.

Figure 2-7
Sensitive Northern Shrimp Fishing Zones

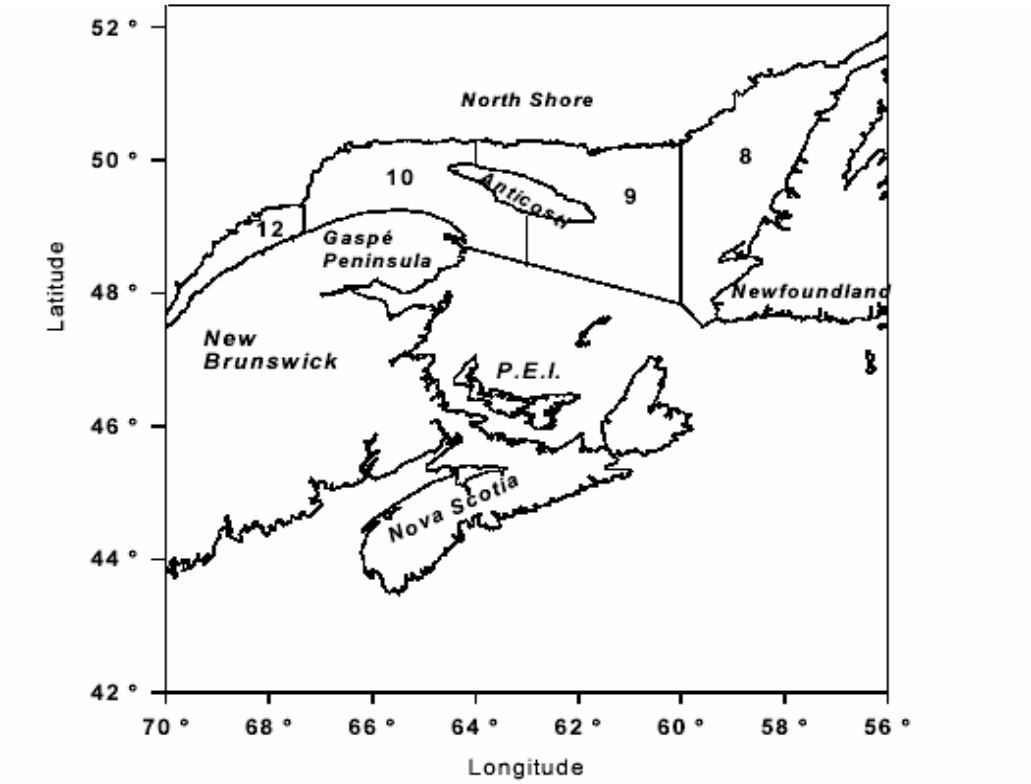


Source: (2004)

The current offshore fleet is comprised of twelve to thirteen factory freezer trawlers. All are purpose-built for shrimp trawling and processing; though some are also able to process and freeze groundfish. They range in length from 49m to 75m, with hold capacities ranging from 400 to 1,960m^3. These vessels operate out of ports in Newfoundland and Nova Scotia, with occasional landings in Greenland when fishing in far northern waters (SFA 1). Fishing trips generally last until the hold is full, a period ranging from 20 to 75 days, depending on catch rates and hold capacity. The larger and more modern vessels may make more than six to eight fishing trips per year, averaging 270-320 days annually. The smaller offshore vessels fish for 200-250 days, making eight

to ten trips per year. Vessels participating in these fisheries use small meshed otter trawls to catch the shrimp. Small stern trawlers (less than 20 m) are used on the west coast of Newfoundland for trips of one or two days' duration, while vessels from Quebec and New Brunswick are generally larger, capable of towing larger trawls and able to remain at sea for longer periods of time. The larger offshore stern trawlers in the Labrador Sea and Davis Strait use very large trawls and can remain at sea for a month or more. The northern shrimp resources of Sept-Îles, Quebec and Port au Choix, on the west coast of Newfoundland have now been fully exploited. Areas in the southern Gulf of St. Lawrence around Anticosti Island and on the Scotian Shelf are becoming increasingly important as the industry expands.

Figure 2-8
Gulf Shrimp Fishing Areas



Source: (2004)

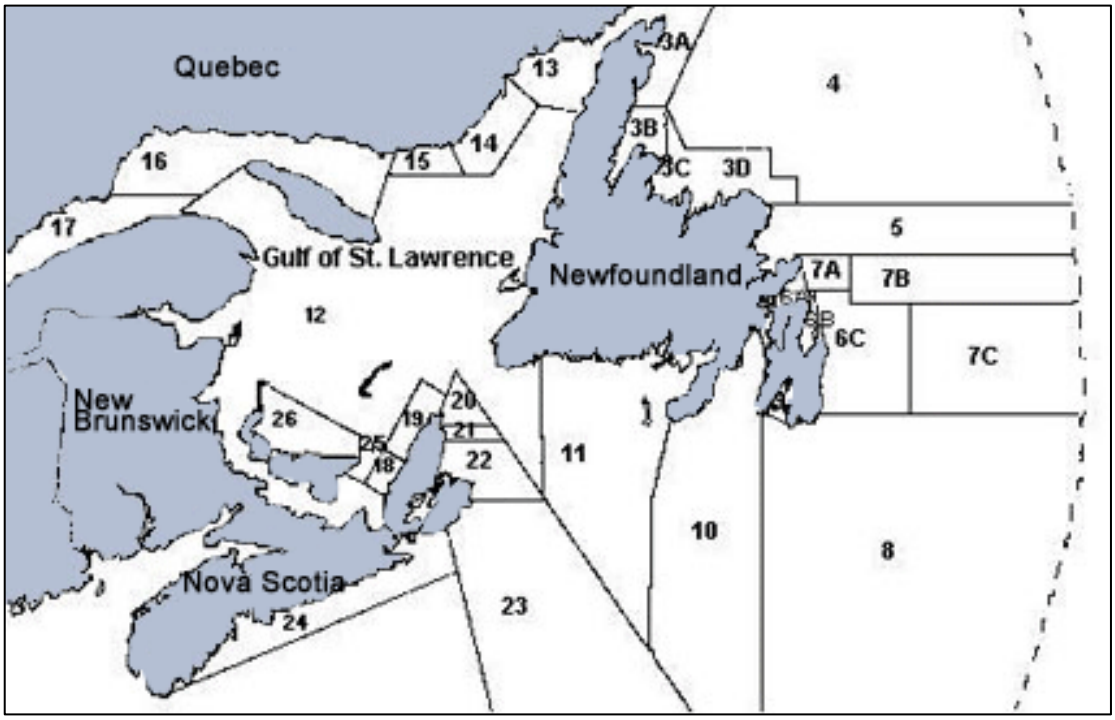
There are four main concentrations of shrimp in the Gulf, namely in the Estuary of the St. Lawrence, west Anticosti Island, north Anticosti Island and in the Esquiman Channel. They are managed as four independent stocks. Area 10 Sept-Îles has historically been the zone with the most abundant landings, the average in the years 2000 - 2003 is 10,740 TM followed by area 9 Anticosti with 7,530 TM and area 8 Esquiman with 7,360.

Estuary of the St. Lawrence with just 775 tons represented 3% of the historical landings for the same period. Shrimps are fished commercially from spring to fall (April 1 to December 31) in the four areas. The shrimp fishery is controlled by a number of management measures, including total allowable catches (TAC) in the four areas. The inshore fleet is mainly composed of vessels smaller than 65 ft. operated by either adjacent fishers or core fishers who geared up to fish in shrimp fishing area (SFA) 6. Vessels fish using otter trawls, with a few using beam trawls. Some experimental work is ongoing with shrimp pots in Nunavut. The inshore fishery is conducted on a competitive basis with trip limits and harvesting caps determined and enforced by the industry itself.

Snow Crab (Crassostrea virginica)

Snow crabs are common in the estuary and the Gulf of St. Lawrence, around Cape Breton Island and in the bays of Newfoundland, from Fortune Bay to White Bay. They are also found near Hamilton Bank off Labrador.

Figure 2-9
Snow crab fishing areas



Source: (2004)

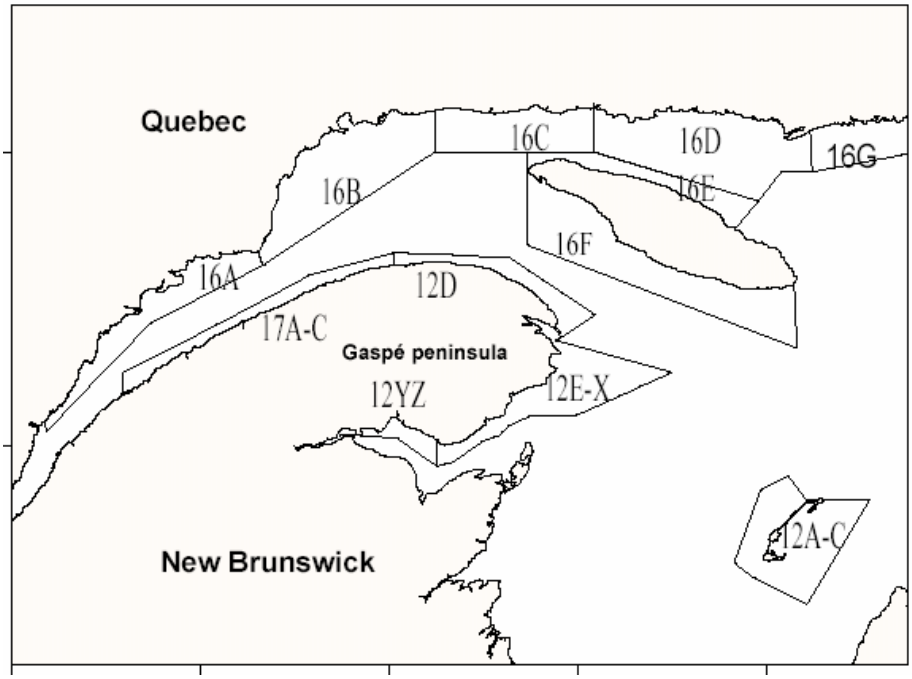
The commercial snow crab fishery in the estuary and northern Gulf of Saint Lawrence is divided into eight management areas, corresponding to three broad geographic regions: the Upper North Shore which also includes much of the north shore of the Gaspé

Peninsula (area 16 and 17), the Middle North Shore (areas 16 and 17) and the Lower North Shore (areas 14 and 13). Areas A, B, and C, which have exploratory status since 1994, were granted permanent status in 2001. In 2003, Area 18 was integrated to Area 12 and a 5 nautical miles no fishing buffer zone was implemented between Area 18 and Area 19. Management of this fishery is based strictly on quotas and effort controls (number of licenses, trap limits and season). The fishery is directed exclusively at males with a carapace width of at least 95 mm. Snow crab is fished with baited traps. Since 1990, the fishery on the Upper and Middle North Shore has opened at ice break-up (March-April) and generally closed after 10 to 14 weeks (June-July). On the Lower North Shore, the opening of the fisheries is always later because the ice cover there stays longer, and the season generally does not begin until June and ends in October or November.

Rock crab (Cancer irroratus)

The rock crab is found along the east coast of North America, from Labrador to South Carolina. This fishery is managed by controlling fishing effort; the number of licenses and traps is limited. The fishery is also managed by fishing areas. Since 1996, the tonnage and value of landings have gradually increased (1, 761 tons have been captured in 2003). The main fishing areas for this specie in Quebec are the Magdalen Islands (12 A-C), Chaleur Bay (12 E-Z) and the North shore of Gaspé Peninsula (12 D).

Figure 2-10
Rock Crab Quebec Fishing Areas



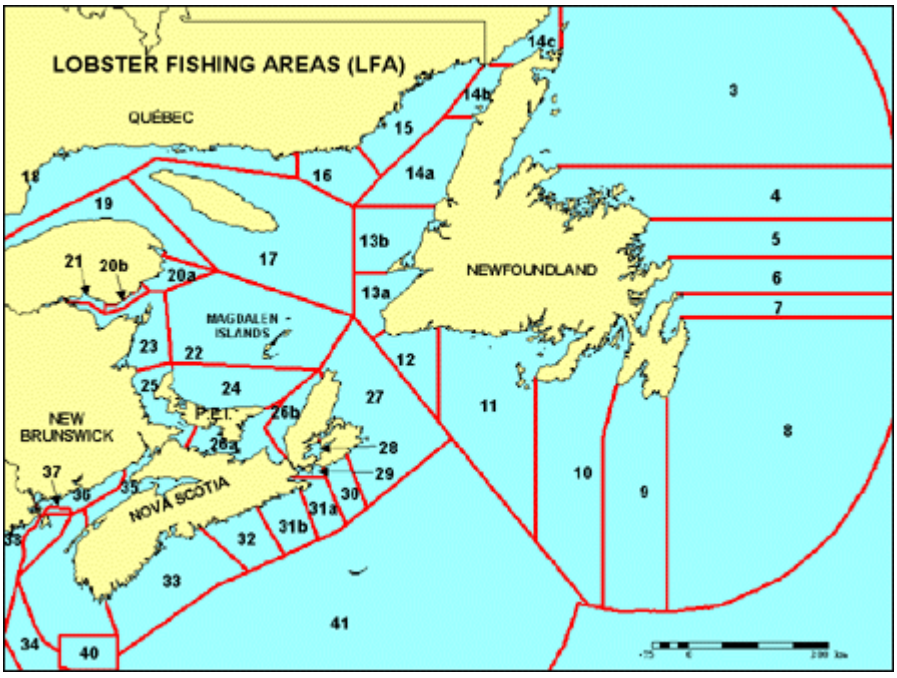
Source: (2004)

American Lobster (*Homarus americanus*)

American lobster occurs along the west coast of the Atlantic Ocean, from Labrador to Cape Hatteras. Landings peak twice a year, once in the period from April to June when the spring season opens, and then again in December after the winter fishery opens in southwestern Nova Scotia.

Adult lobster prefers rocky substrates where they can take shelter, but can also live on sandy and even muddy bottoms. Commercial-size lobsters are generally found at depths less that 35 m. This fishery is managed by controlling fishing effort. The number of licences and the number of tramps per licence are limited. The waters of Atlantic Canada are divided into 41 Lobster Fishing Areas or LFAs (see map), each with its own season, varying in length from eight weeks to eight months. In Quebec, there are 8 main lobster fishing areas (LFSs 15 to 22) and 41 sub-areas. Québec lobster landings totalled 3,135 tons in 2003 which 66.6% of the landings came from the Magdalen Islands, 28.5% from the Gaspé Peninsula, 3.6% from Anticosti Island and 1.3 % from the north shore.

Figure 2-11
Lobster Fishing Areas

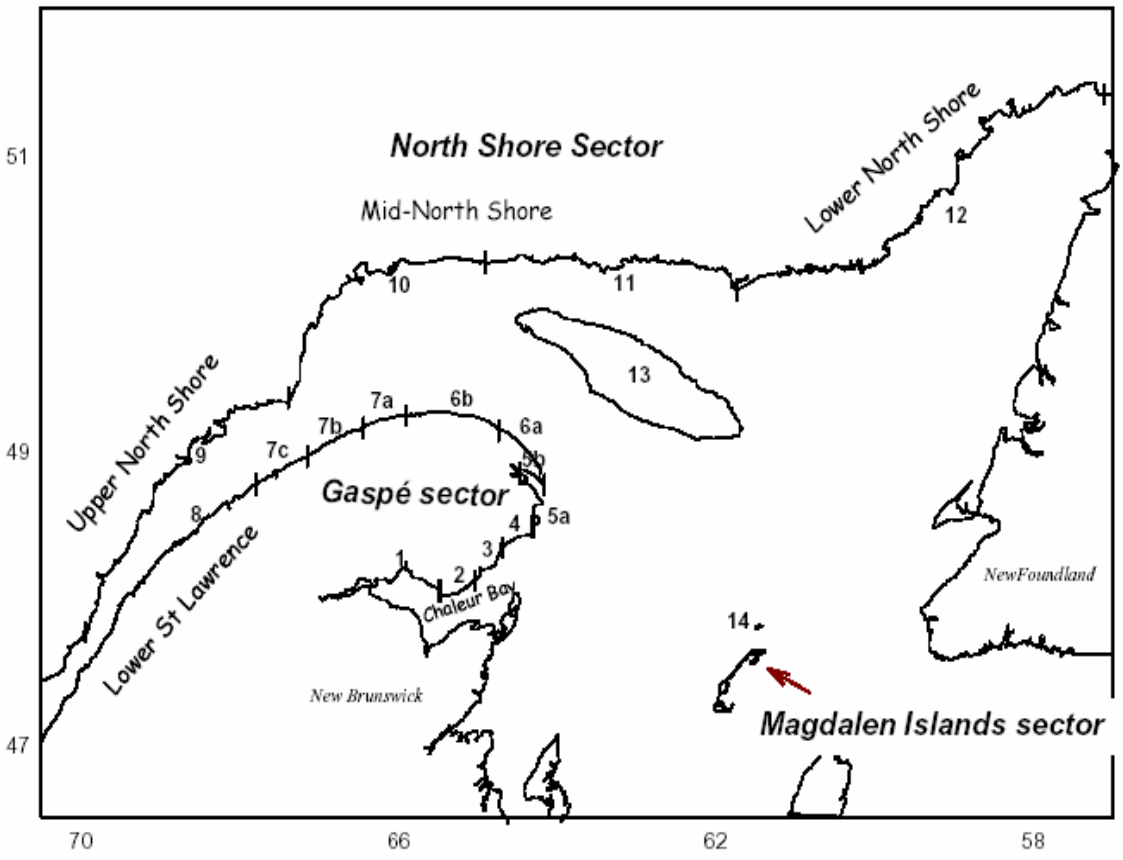


Source: (2004)

Green urchin (Strongyloncentrotus droebachiensis)

In Quebec, the green sea urchin fishery has recently begun. In Québec, the green sea urchin fishery is recent. It is currently not harvested very much but has considerable commercial potential. They are harvested for their gonads, which are considered a delicacy. The fishing season takes place mainly in the early spring and during the fall. There are 14 main fishing areas in the inshore waters of Quebec. Two fishing methods are currently authorized in the Laurentian Region, hand-gathering by divers and the use of whelk traps. Harvesting by divers is generally allowed in all areas, except five exclusions in area 9. The sea urchin fishing season is limited, the fishery begins in April and generally stops in May.

Figure 2-12 Green Urchin Quebec Fishing Areas



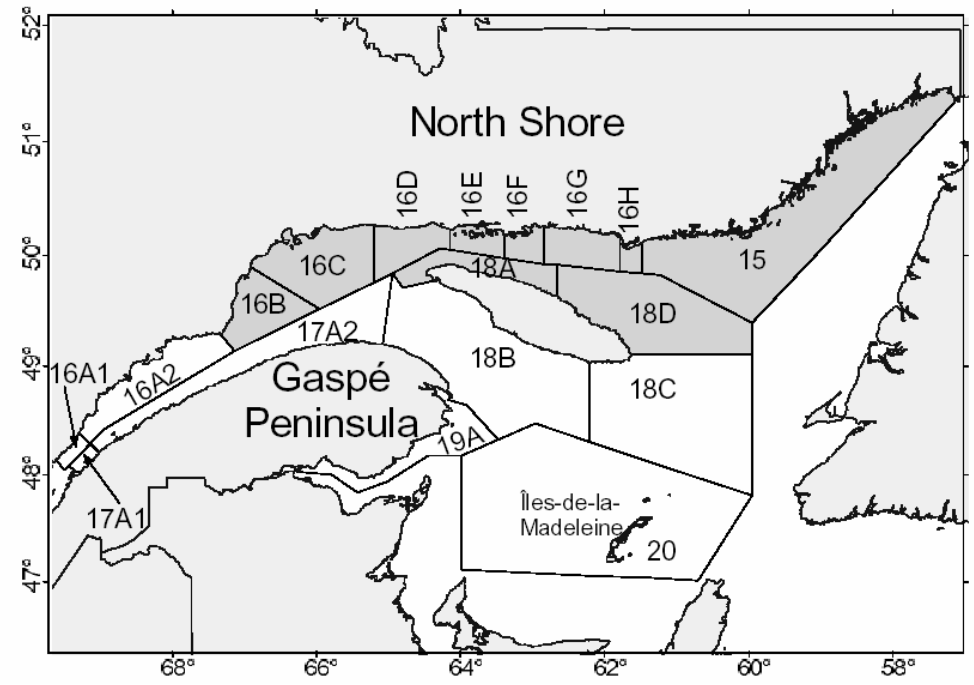
Source: (2004)

Scallops

There are two species of scallops in the Gulf of Saint Lawrence: the sea scallop and the Iceland scallop. The two species are not distributed uniformly in the Gulf of Saint Lawrence, and catches in any one area usually consist of just one species. On the Upper North Shore and the Middle North Shore, landings are made up almost exclusively of Iceland scallops, whereas on the Lower North Shore both species are present and landings may be mixed.

The North Shore region is divided into 12 management units managed by controlling effort, but most of them are governed by quotas as ell. The north shore region has posted the largest scallop landings in Quebec since 1985.

Figure 2-13
Scallops Quebec Fishing Areas



2.1.4 Diadromous

Alewife

Fishermen make no distinction between the alewife (*Alosa pseudolarengus*) and a closely related species; the blueback herring (*A. aestivalis*). Alewives range along the Atlantic coast of North America southward from Newfoundland to South Carolina. Within the Maritimes, they are abundant in large rivers such as the Miramichi, Margree, LaHave, Tusket, Shubenacadie and Saint John and proportionately less abundant in most small streams. They are present but relatively scarce in the Restigouche River and Bay of Chaleur area, and absent along much of the south and north shores of the St. Lawrence River although they can be found upstream at least as far as Montreal. Small populations exist along the western and southern coasts of Newfoundland. Important fisheries exist in most of the Atlantic coastal regions of the Maritime Provinces, particularly New Brunswick and Nova Scotia.

American eel

American eels occur in the estuaries and coastal freshwaters of North America. They can be found from their northern limit in the Hamilton Inlet-Lake Melville Estuary of

Labrador, south from Newfoundland and the Gulf of St. Lawrence along the Atlantic coast of Canada.

Historically, the most successful eel fisheries have occurred along the St. Lawrence River from Trois-Rivières to Rivière-du-Loup, where the catch consists mainly of the more valuable silver eel. Smaller, but still important, fisheries which harvest mostly yellow eels exist along the northeast shore of New Brunswick, on Prince Edward Island and along the southern coast of mainland Nova Scotia, and on Cape Breton Island. Newfoundland has a minor fishery.

2.1.5 Mammals

Six species of seals (the harp, hooded, grey, ringed, bearded and harbour) are found off the Atlantic coast of Canada, although ringed and bearded seals are typically Arctic species. Of the six species, harp and hooded seals account for almost all the seals hunted commercially. A number of grey seals are also taken for commercial uses under licences issued for that purpose.

The Northwest Atlantic breeding stock of harp seals spends the summer in the Canadian Arctic and Greenland. They begin their southward migration in early fall and by late November reach the southern Labrador coast. From here, about a third of the mature seals enter the Gulf of St. Lawrence and the rest migrate southwards along the east coast of Newfoundland

Harp seals are harvested commercially in the Gulf of St Lawrence and off the coast of northeast Newfoundland and Labrador. The commercial hunt is carried out using longliners (vessels 35'-65' in length) or small boats (vessels under 35' in length). Where there is solid ice and seals are close to shore, sealers may hunt on foot or using snowmobiles. The majority of sealing occurs between early March and May, beginning around the second week in March off the Magdalen Islands, and about the second week in April off Newfoundland. The timing of hunt activities in the Gulf of St. Lawrence depends largely on the movement of ice floes on which seals are located. The peak commercial hunt in this area is in March, although sealing does occur along the Quebec North Shore in January and February.

In the Gros-Cacouna Area, there are also five species of whales that can be encountered (

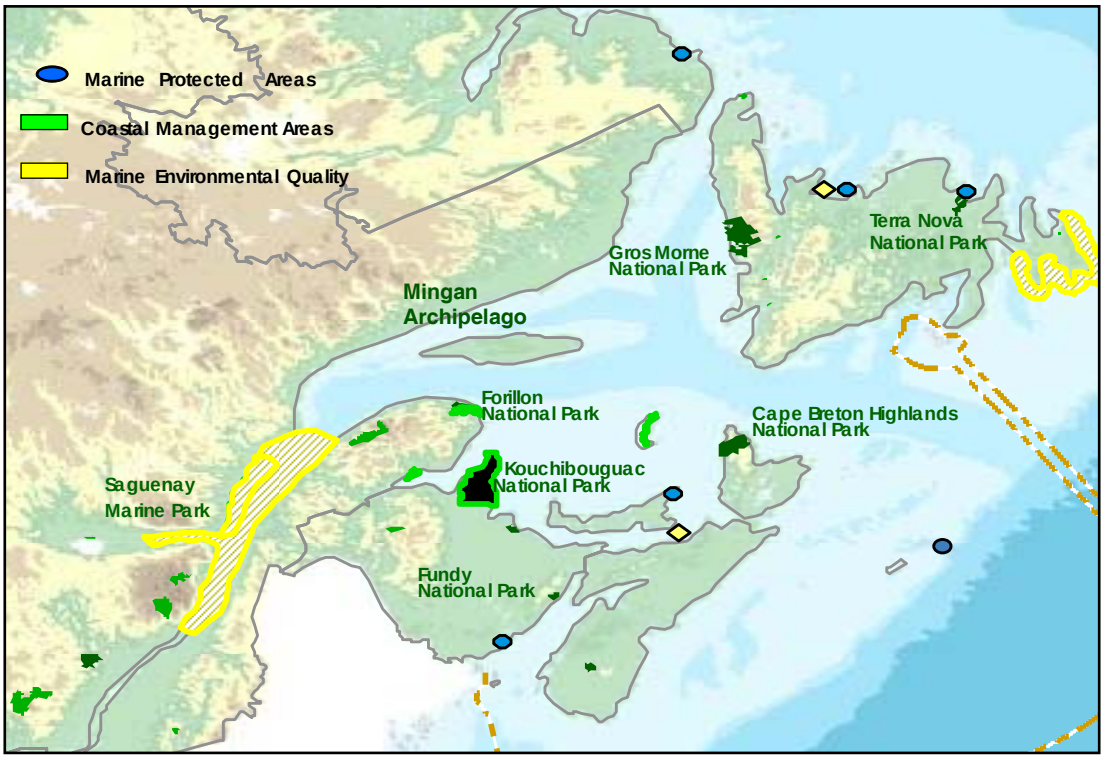
Table 2-1). None of these species stay year-round in the immediate sector of Gros-Cacouna but the Beluga is nonetheless a year-round resident of the St. Lawrence. Whales come to the Gros-Cacouna Area from spring to fall for feeding purposes.

2.2 SENSITIVE MARINE AREAS

The objective of this section is to identify all areas that, while now protected, could become exposed to the activities generated by the Gros-Cacouna Energy LNG Terminal. Sensitive areas located within or in proximity to the routes followed by the vessels that will visit the terminal will be also identified.

Data for this section has been obtained from Oceans Program Activity Tracking (OPAT), which is an interactive mapping and information system that provides details on *Oceans Act* program activities currently underway in each of Canada's ocean environments. These activities include Large Ocean Management Areas, Coastal Management Areas, Marine Protected Areas and Marine Environmental Quality projects which all directly support the delivery of Canada's Oceans Strategy. Figure 2-14 shows sensitive marine areas located in the Canadian east coast and St. Lawrence Gulf and estuary. National parks are quoted in dark green and provincial parks are identified in light green color.

Figure 2-14
Atlantic Sensitive Marine Areas

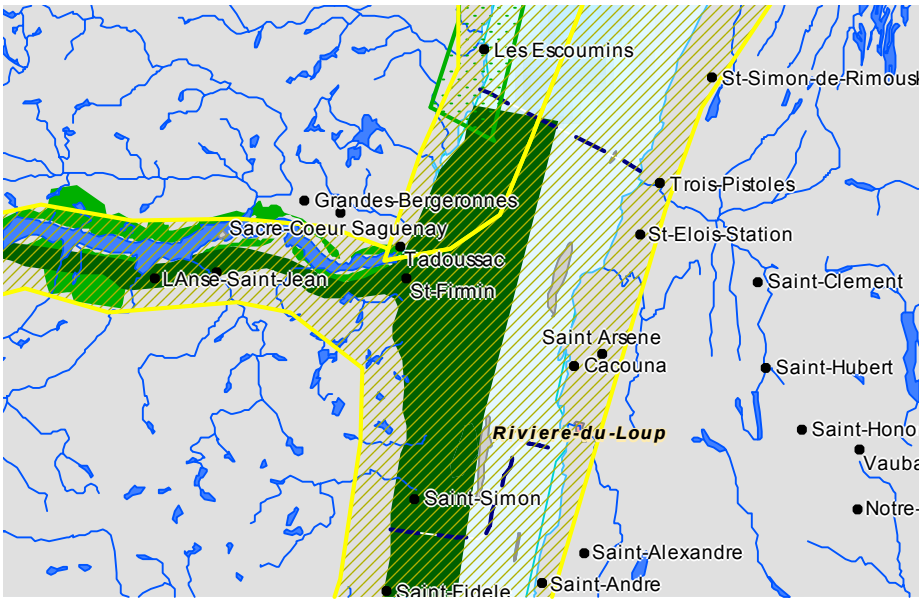


Source: Maritime Innovation adapted from DFO's OPAT (2004)

The following figure illustrates sensitive areas located in proximity to Cacouna, the municipality where the terminal will be installed. More specifically, Figure 2-15 point up sensitive areas within Saguenay River / Saint Lawrence River located in proximity to *Rivière du Loup* region. Two Marine Environment Quality projects are on going within this area, one is trying to determine the concentrations OF harmful metal and organic contaminants on the area, and the other is testing an approach for the application of the MEQ concept to the Integrated Coastal Zone Management (ICZM) initiatives.

As in Figure 2-14, zones in light green point up provincial parks and in dark green the Saguenay – Saint Lawrence Marine Park. This is the first park in Quebec to protect and present an exclusively marine environment. The particularity of this park is that is managed jointly by the governments of Canada and Quebec in association with local bodies.

Figure 2-15
Sensitive areas in proximity to Cacouna



Source: Maritime Innovation adapted from OPAT (2004)

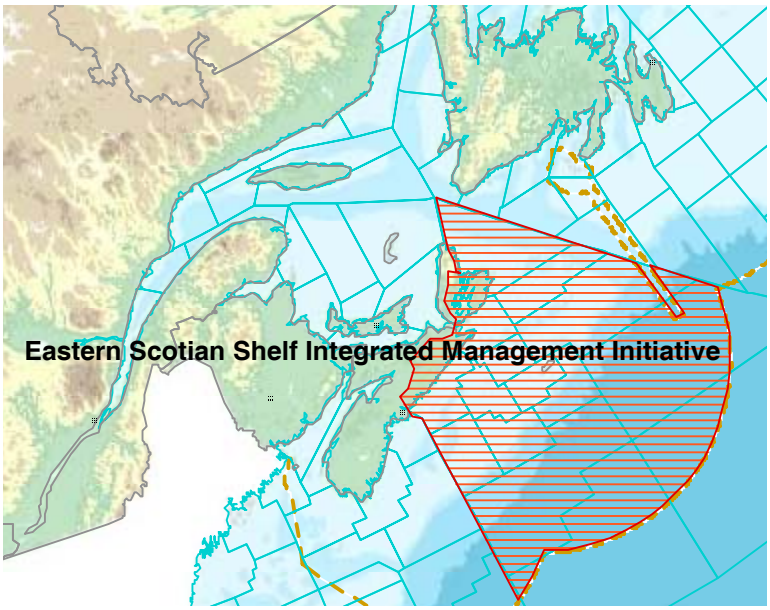
2.2.1 Large Ocean Management Areas (LOMAS)

The one LOMAS concerned by the project will be the one covered by the Eastern Scotian Shelf Integrated Management System (EESSIM), which was established during the development of the Sable Gully Conservation Strategy. In fact, according to data published in OPAT, this initiative is the only functional LOMAS for the entire Canadian Atlantic region.

The ESSIM Initiative is being used to design an intergovernmental and multi-stakeholder planning process to develop and implement and integrated oceans management plan for

this large offshore biogeographic area. It is important to note that the eastern Scotia Shelf is composed of a variety of habitat types which includes shallow banks, gullies, and sedimentary basins right out to the deep-sea environment. The ecosystem supports a wide range of biological species including a diversity of invertebrate, fish and mammal. Economic activity on the eastern Scotia Shelf includes a variety of fisheries, marine transportation, and increasingly important oil gas and exploration and production.

Figure 2-16
Eastern Scotian Shelf Integrated Initiative



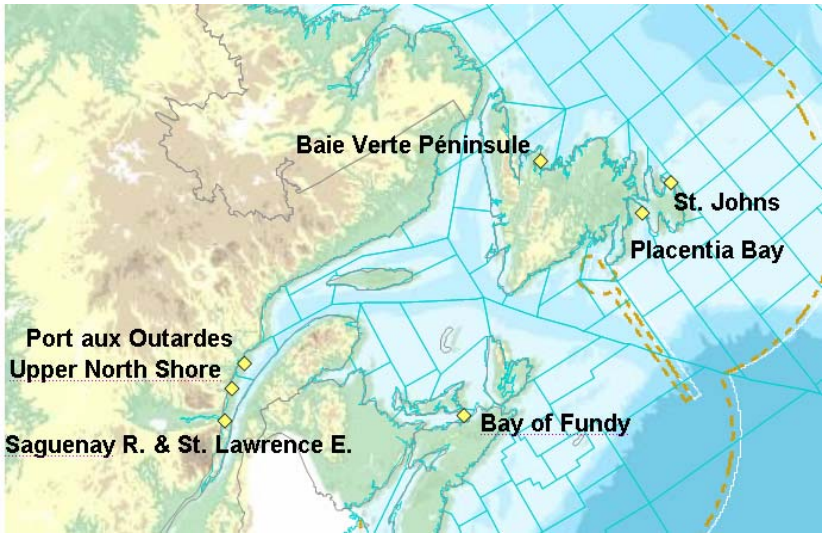
Source: Maritime Innovation adapted from OPAT (2004)

2.2.2 Marine Environmental Quality

According to the Canadian Water sector of Fisheries and Oceans Canada, Marine Environmental Quality (MEQ) tells how healthy marine ecosystems are. Both natural and human activities affect the physics, water chemistry and biology of marine ecosystems. MEQ integrates these environmental conditions to assess the health of marine ecosystems, or their integrity. MEQ's principals goals are to study the functioning of marine ecosystems; the effects of natural and human activities on marine ecosystems and the environmental responses to these changes.

There are seven marine environmental quality zones that may be potentially affected by the project; three of them are located in Québec, three in Newfoundland and one in Nova Scotia.

Figure 2-17
East Coast Marine Environmental Quality Projects



Source: Innovation Maritime adapted from OPAT (2004)

2.2.3 Marine Protected Areas (MPA) and Areas of Interest (AI)

According to the Canadian Water sector of Fisheries and Oceans Canada, Marine protected Area is defined as an area in the marine environment set aside to provide lasting protection for the resources therein.

Figure 2-18
East Coast Marine Protected areas and Areas of Interest

Source: Maritime Innovation adapted from OPAT (2004)

Federal or provincial marine protected areas in Canada have the same primary purpose of maintaining ecosystem integrity and biodiversity while supporting local economies. They provide a safe haven for commercial fish stocks as well as endangered species and offer alternative sources of income for local people. In Canada, MPAs are created to conserve and protect unique habitats, endangered or threatened marine species and their habitats, fishery resources and their habitats, marine areas of high biodiversity or biological productivity, and any other marine resource or habitat requiring special protection. Areas of Interest are potential MPAs that have been set up to facilitate the evolution of the national process for establishing MPAs. We have identified one MPA and six areas of interest that may be potentially affected by the Terminal activities.

The Gully is the unique official marine protected area located in the east coast of Canada; the others are considered as IA and are currently under study for becoming MPA's. Manicouagan Peninsula region is the IA located the nearest to Cacouna. This area is considered as having high primary and secondary productivity and high habitat diversity. The objective of establishing a MPA in this zone is to conserve and protect the marine ecosystem of the Manicouagan Peninsula.

One zone of significant importance is the St. Lawrence Estuary Marine Protected Area Project which purpose is to ensure the conservation and long-term protection of marine mammals that live year-round in the St. Lawrence Estuary or only certain times of the year and of their habitats and food and resources. The St Lawrence Estuary is a major feeding ground for species of marine mammals because of high concentration of forage species such as krill and capelin. This future MPA of approximative 6000 km^2 will cover the belugas's summer distribution range and most of the areas where the St. Lawrence Estuary harbour seal population is found, as well as significant feeding areas for the blue whale. The MPA is adjacent to the Saguenay-St. Lawrence Marine Park. It does not include the marine park territory, but is complementary to it.

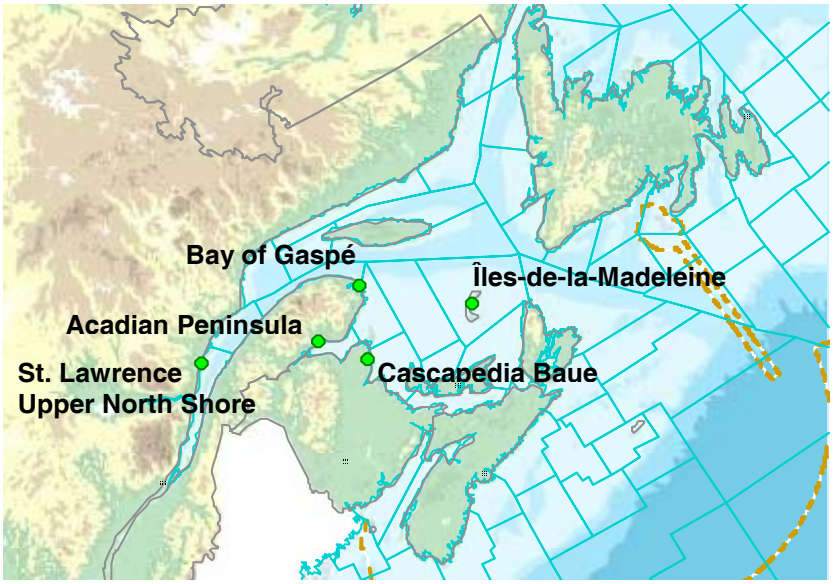
2.2.4 Coastal Management Areas (CMA)

Ecosystem-based management objectives identified at the Large Ocean Management Area scale will need to be reflected in the Marine Environmental Quality objectives and guidelines for the Coastal Management Areas.

Five coastal management areas are in proximity to the Cacouna Energy LNG Terminal; in

Figure 2-19 they are identified in blue. The CMA with major importance for this study in the one located in proximity to Cacouna, which is one based within the Saint Lawrence Upper North Shore area. The objective of this CMA is to develop an integrated management approach based on the involvement of local communities.

Figure 2-19
Coastal Management Areas



Source: Maritime Innovation adapted from OPAT (2004)

2.2.5 National Parks

The most important and the closest national park to the proposed terminal is the Saguenay/St. Lawrence Marine Park. Other national that may be affected are:

- Forillon National Park (Quebec);
- Mingan Archipelago National Park (Quebec);
- Gros Morne National Park (New Foundland);
- Terra Nova National Park (New Foundland);
- Cape Breton Highlands National Park (Nova Scotia);
- Kauchibouguac National Park (New Brunswick);
- Fundy National Park (New Brunswick).

Provincial parks in Quebec that would be affected are illustrated in **Error! Reference source not found.**. The Parc du Bic, Point Taillon park, the Bonaventure Island, the Miguashia Park, the Boucherville Islands and the Anticosti Park are some of the parks having coastal zones.

Figure 2-20
Quebec Provincial Parks

Source: Sepaq (2005)

Table 2-2
List of Sensitive Marine Areas

Concerned Areas	Zone	Localization (EcoZone-Region-Province)	Conservation and Protection Goals
Eastern Scotian Shelf	**LOMA**	Off shore NAFO fishing zones 4VW	The ESSIM Initiative is being used to design an intergovernmental and multi-stakeholder planning process to develop and implement an integrated oceans management plan for this large offshore biogeographic area.
Saguenay R. & St. Lawrence	**MEQ**	Atlantic Marine Quebec – Quebec	
Upper North Shire	**MEQ**	Northwest Atlantic Marine Quebec – Quebec	
Point aux Ourtardes	**MEQ**	Northwest Atlantic Marine Quebec – Quebec	
Baie Verte Peninsula	**MEQ**	Atlantic Marine Newfoundland – Newfoundland	
Placentia Bay #1	**MEQ**	Atlantic Marine Newfoundland – Newfoundland	
Avalon Peninsula #2	**MEQ**	Atlantic Marine Newfoundland – Newfoundland	
Bay of Fundy #1	**MEQ**	Atlantic Marine Gulf – New Brunswick	
The Gully	**MPA**	Atlantic Marine Maritime – Nova Scotia	To protect marine mammals and their habitat particularly a vulnerable population of northern bottlenose whales, hard corals and deep sea fish. Protection of a unique submarine and an upper canyon basin.
Manicuagan Peninsula	**AI**	Northwest Atlantic Marine Quebec – Quebec	To conserve and protect the highly diversified and productive estuary and marine ecosystems (salt marshes, eelgrass beds, immense tidal flats, estuaries, spawning grounds, harbour seal haul-outs, etc.) of the area.
Gilbert Bay	**AI**	Northwest Atlantic Marine Newfoundland – Newfoundland	To protect the key species (such as Atlantic cod) and habitats of Gilbert Bay.
Leading Tickets	**AI**	Northwest Atlantic Marine Newfoundland – Newfoundland	To conserve and protect lobster and blackback flounder and their habitats.
Eastport	**AI**	Northwest Atlantic Marine Newfoundland – Newfoundland	To implement and evaluate lobster conservation and protection measures, as well as protect other important species, including sea urchins and lumpfish.
Basin Head	**AI**	Northwest Atlantic Marine Gulf – Price Edward Island	Conservation and protection of a unique strain of Irish moss and high biodiversity of the lagoon ecosystem.
Musquash Estuary	**AI**	Atlantic Marine Maritime – New Brunswick	To protect one of the last ecologically intact salt marsh complexes in the Bay of Fundy.
St. Lawrence Upper North Shore	**CMA**	Northwest Atlantic Marine Quebec – Quebec	To promote resource and habitat conservation, user conflicts.
Bay of Gaspé	**CMA**	Northwest Atlantic Marine Quebec – Quebec	To facilitate the community development in a sustainable manner In the area where there is a potential for aquaculture and tourism. The area also includes productive habitats for marine animals and birds.
Cascapedia Bay	**CMA**	Northwest Atlantic Marine Quebec – Quebec	To promote community involvement around the objective of maintaining and improving the quality and productivity of the marine ecosystem; harmonizing activities and supporting sustainable development.
Acadian Peninsula	**CMA**	Atlantic Marine Gulf – New Brunswick	To support efforts to conserve and protect the natural resources and amenities.
Îles de la Madeleine	**CMA**	Northwest Atlantic Marine Quebec – Quebec	To favour the conservation of the five most important inland water bodies and the harmonization of uses by an integrated management approach.

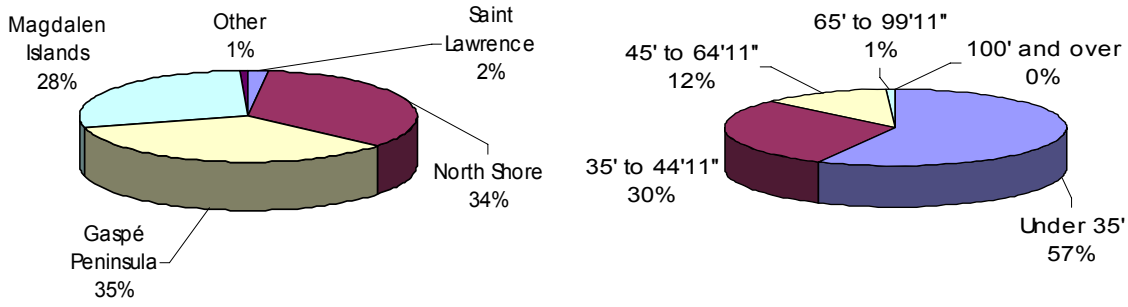
2.3 FISHING OPERATIONS

This section identifies fishing activities taking place within an area that has been selected considering future shipping routes followed by vessels calling to the Cacouna Energy Terminal. Shipping routes presently pass through some important fishing zones in Atlantic regions where fishing operations are. Major fishing activities are presented in this section, starting with a description of fishing operations activities in the Region of Québec, which is of relatively close proximity to the proposed Cacouna Energy LNG Terminal.

2.3.1 Québec Region

In 2002, 1,240 vessels were active, among the 1,444 that were registered in the Quebec region. The North shore and the Gaspé Peninsula were the sectors with the largest numbers of registered vessels, with 494 and 507 vessels each. The vessel category most representative in the region for the same year was the category of less than 35' in length. Additionally, there were no vessels of 100' length or larger registered in the Quebec region. Figure 2-21 shows the distribution of vessels in Quebec according to port of landing and length.

Figure 2-21
Quebec distribution of vessels according to port of landing and length



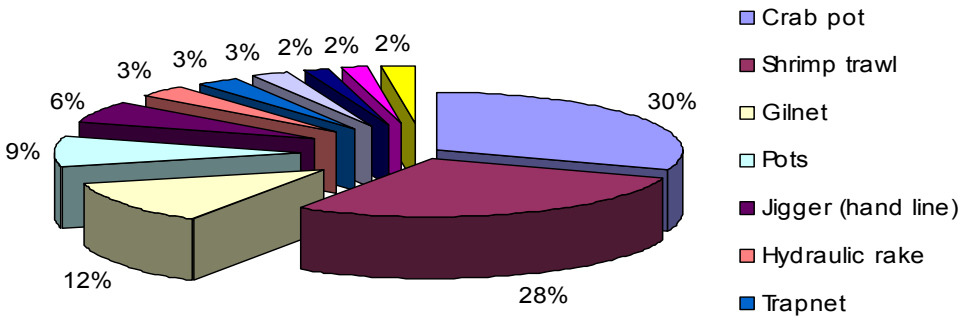
Source: DFO (2002)

In 2002, molluscs and crustaceans fisheries represented 58% of the vessels under 35' and 60% of the vessels of 35' to 44'11''. Shrimp and snow crab fisheries alone accounted for 87% of the landings of vessels of 45' to 64'11'', with 49% and 38% respectively. Finally, for vessels 65' and over, shrimp fisheries represented 99% of the total landings. Monthly data regarding landings for years 2001 and 2002 show that summer landings represent on average 65% of the total annual landings in the Quebec region. There are almost no landing activities between January and February, just some groundfishs and soft shell clams landings with less than 100 tonnes on average each year.

Data regarding landings by type of fishing gear shows that the crab pot (fixed gear) and the shrimp traps (mobile gear) are the most widely used fishing gear for 2001 and 2002. These results agree with landing results that showed the shrimp and the snow crab as the most landed species in the Quebec region for the same two years.

Table 2-3 lists the top 10 municipalities by landings in tonnes, Figure 2-22 shows in order of importance all the municipalities in the Quebec region by having more than 50 landings during the year of 2002. The top municipality in 2002 was Rivière au Renard located in Gaspé with 22.67% of the total landings. This municipality was ranked fifth in frequency of landings (1,234) in 2003 just after Forestville (6,497), Grande Entrée (1,756), Cap-aux-Meules (1,579) and Portneuf (1,384). Figure 2-22 shows the frequency of landings by municipalities.

Figure 2-22
Landings in Quebec region by type of fishing gear

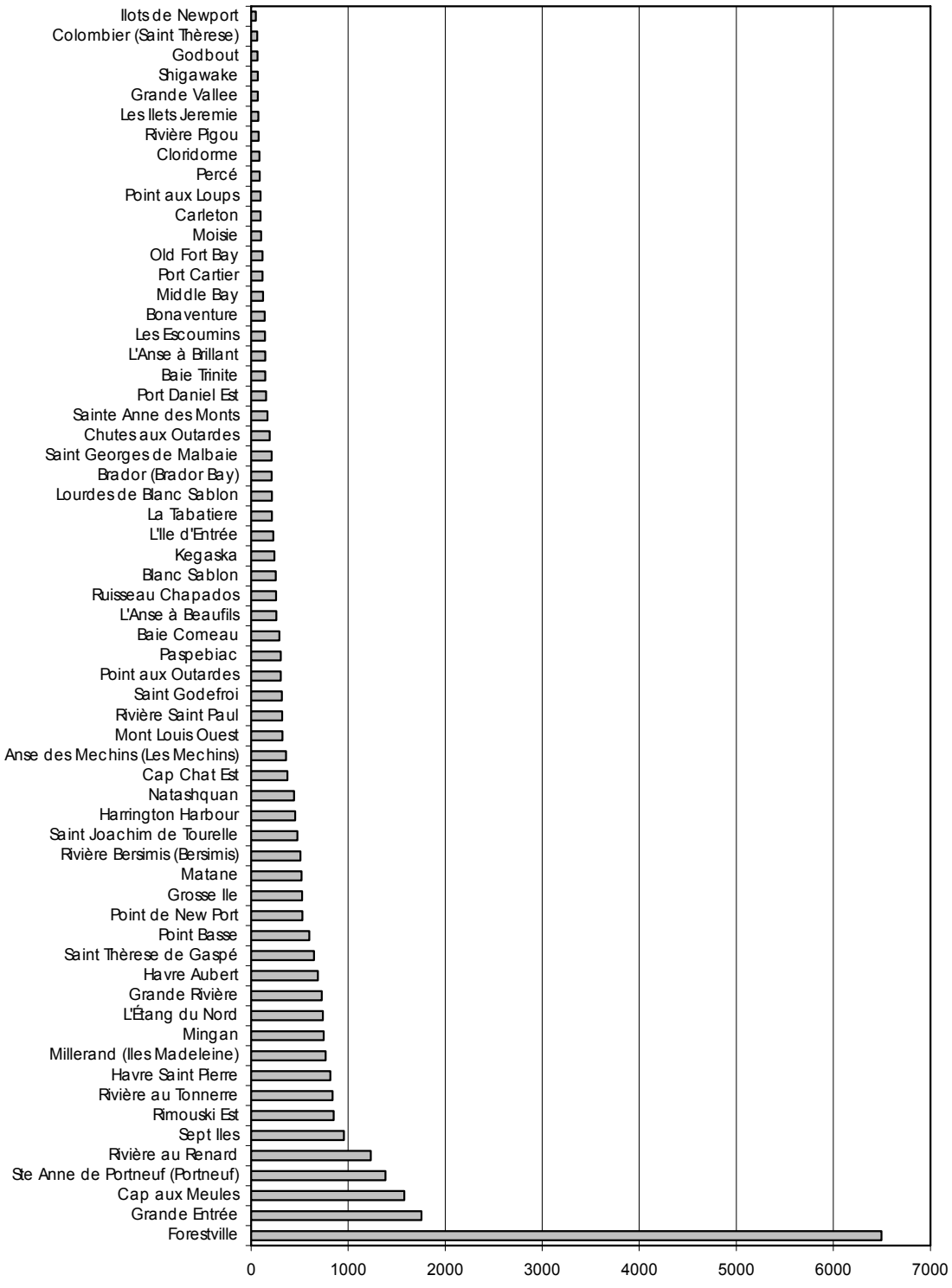


Source: DFO (2002)

Table 2-3
Top 10 Municipalities by Landings in Quebec Region (DFO, 2003)

MUNICIPALITY	SECTOR	QUANTITY (tonnes)	% OF TOTAL FOR QUEBEC REGION
1. Rivière au Renard	Gaspé	13 191	22,67
2. Sainte Thérèse de Gaspé	Gaspé	3 717	6,39
3. Cap aux Moules	Magdalen Island	3 520	6,05
4. Grande Entrée	Magdalen Island	2 932	5,04
5. Grande Rivière	Gaspé	2 613	4,49
6. Saint Anne des Monts	Gaspé	2 171	3,73
7. Matane	Gaspé	1 973	3,34
8. Havre Saint Pierre	North Shore	1 700	2,92
9. Sept îles	North Shore	1 566	2,69
10. Rimouski Est	Gaspé	1 484	2,55

Figure 2-23
Frequency of Landings by Municipalities in Quebec Region (DFO, 2003)



2.3.2 Newfoundland Region

In 2002, 2,765 vessels were active in the Newfoundland region. The top 10 statistical fishing area Western Bay Head – Feather point accounted for almost 50% of the landings for the Newfoundland region. Landings of pelagics accounted for almost 22% of the total landings followed by groundfish with 20 % and surfclams with 6%. The distribution of vessel according to length in Newfoundland is shown in Figure 2-24. Figure 2-25 and

Figure 2-26 shows respectively the distribution of landings by municipality and fishing area.

Figure 2-24
Newfoundland distribution of vessels according to length (DFO, 2002)

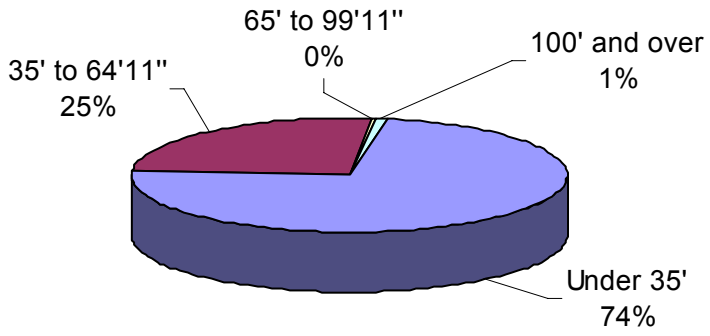
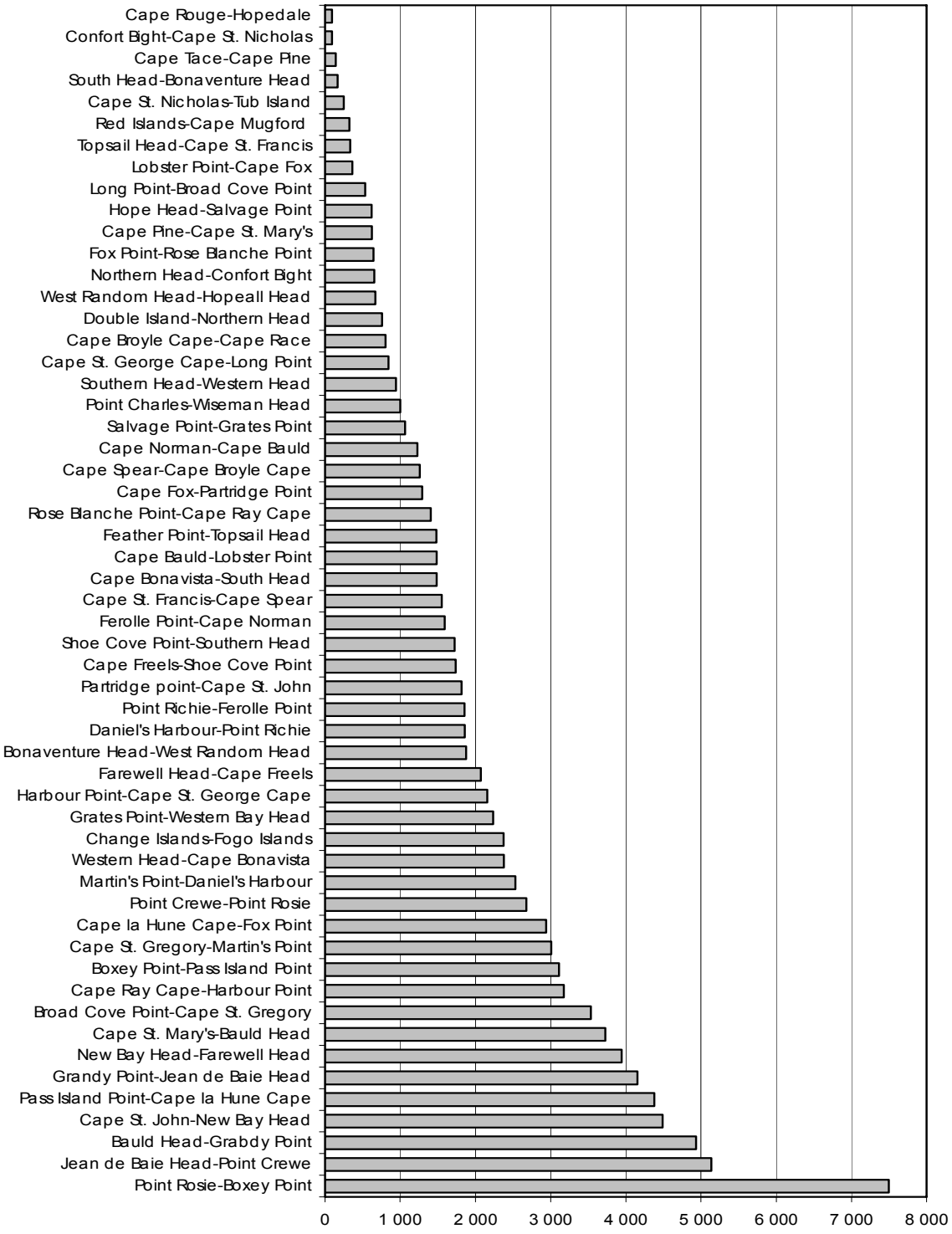


Figure 2-25
Top 10 Municipalities by Landings in Newfoundland Region (DFO, 2003)

FISHERIES STATISTICAL AREA	QUANTITY (KG)	% OF THE TOTAL FOR NEWFOUNDLAND REGION
1. Western Bay Head to Feather Point	24 957 626	9,07
2. Jean de Baie Head to Point Crewe	20 926 182	7,61
3. Broad Cove Point to Cape St. Gregory	16 817 290	6,11
4. Cape Bauld to Lobster Point	15 036 683	5,47
5. Point Crewe to Point Rosie	13 040 399	4,74
6. Feather Point to Topsail Head	11 956 840	4,35
7. Cape St. Francis to Cape Spear	11 514 310	4,19
8. Harbour Point to Cape St. George Cape	8 141 377	2,96
9. Partridge Point to Cape St. John	8 061 573	2,93
10. New Bay Head to Farewell Head	7 954 827	2,89

Figure 2-26
Frequency of Landings by Fisheries Areas in Newfoundland Region (DFO, 2003)



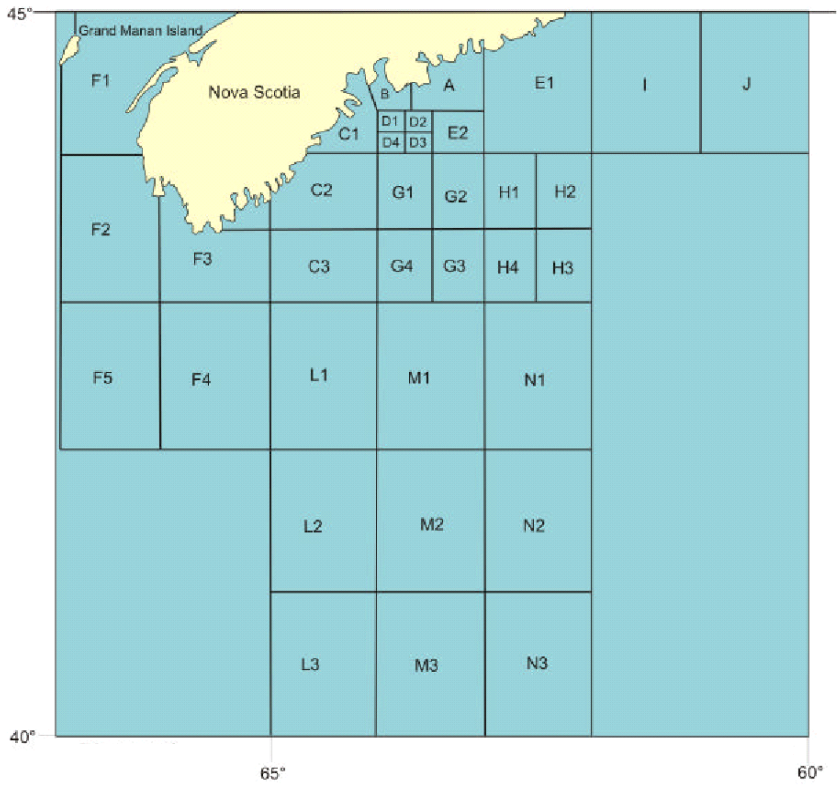
3 *Offshore Exercise, Exploration and Exploitation Activities*

This section is divided into two parts. The first part identifies the geographical locations and frequency of use of military exercise areas involving ships and aircrafts. The second part identifies the geographical locations and frequency of offshore exploration and exploitation. Information pertaining to routes used by offshore supply, seismic and survey vessels are also included in this part but existing traffic (2003) is also included in section 1

3.1 MILITARY EXERCISE AREAS

In this section, military exercise areas involving ships and aircrafts are defined. Within Canada's 200 nautical miles Exclusive Economic Zone and up to Cacouna, exercise areas can be found in Nova Scotia, Newfoundland and the Gulf of St. Lawrence. Before any exercises are conducted in these areas, Maritime Command Atlantic of the National Defence coordinates the publication of a notice to mariners for the specified area.Figure 3-1 illustrates the location of exercise areas in Nova Scotia.

Figure 3-1
Nova Scotia Exercise Areas

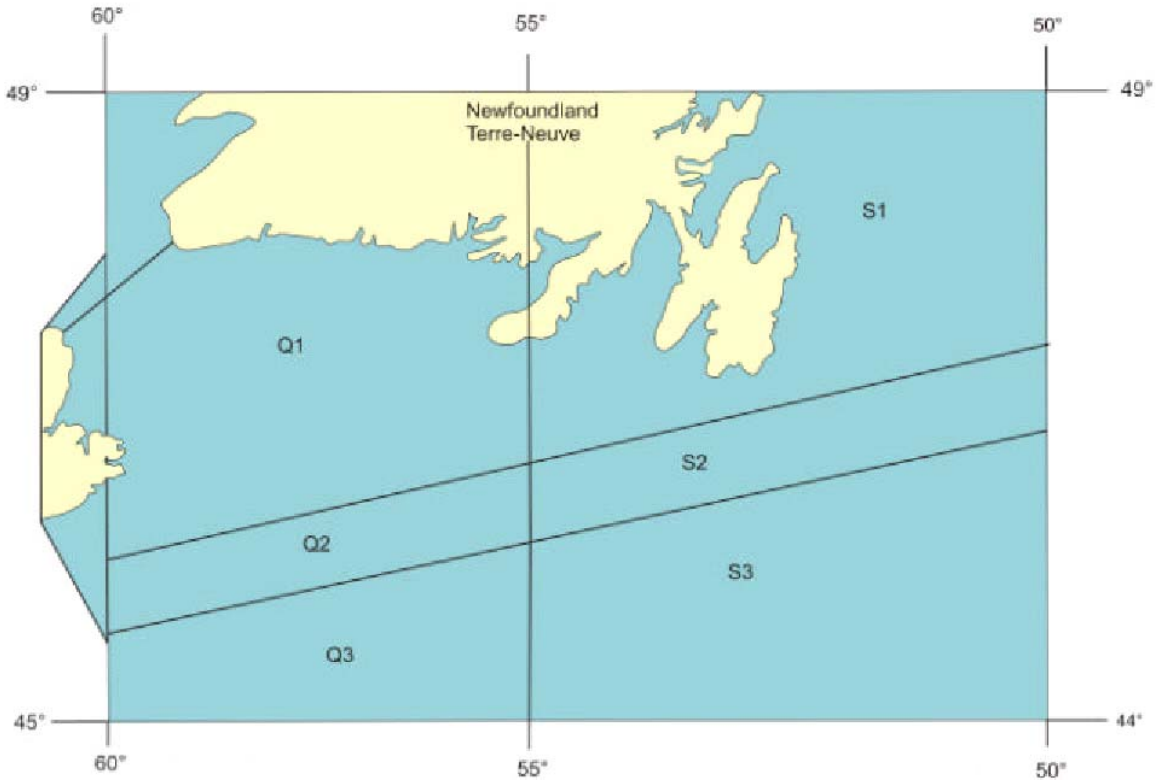


Source : http://www.notmar.gc.ca/eng/services/2004_annual_e/section_f/notice_35_e.pdf

Specifically, except for Halifax Harbour located within zone A, all the zones identified in the previous map are susceptible to having sub surface exercises. Within area A, there is an underwater demolition training zone delimited by an arc from the shoreline centred on 44°42'43''N-63°38'40''W with a radius of 365 metres. It is also possible that firing exercises up to 20,000 feet in the air can be done in zones D1, D2, D3, D4 and E2. The same is true for zones G1, G2, G3, G4, H1, H2, H3, and H4 except for the vertical distance, which is 30,000 feet. According to the National Defence, exercise zones offshore of Nova Scotia are used on a regular basis year round.

For the Gulf of St. Lawrence, all waters East of 68°W, West of 56°W in the Belle Isle Strait and West of a line traced between coordinates 60°25'W-47°00'N and 59°18'W-47°31'N in the Cabot Strait are considered to be sub surface exercise areas. Figure 3-2 illustrates exercise areas in the Southern portion of Newfoundland. All these areas, except within French territorial waters, are susceptible to holding sub surface exercises but the National Defence indicates that these zones have not been used in the past five years and there is no intention of using them in the next five years.

Figure 3-2
Southern Newfoundland Exercise Areas



Source: http://www.notmar.gc.ca/eng/services/2004_annual_e/section_f/notice_35_e.pdf

3.2 OFFSHORE EXPLORATION AND EXPLOITATION

In Eastern Canada, exploration and exploitation activities are managed by three organisations. These organisations are the Ministère des Ressources naturelles, et de la Faune (MRNF), the Canada – Newfoundland Offshore Petroleum Board and the Canada – Nova Scotia Offshore Petroleum Board. In this context, the identification of exploration and exploitation activities is defined in this section with respect to each organisation.

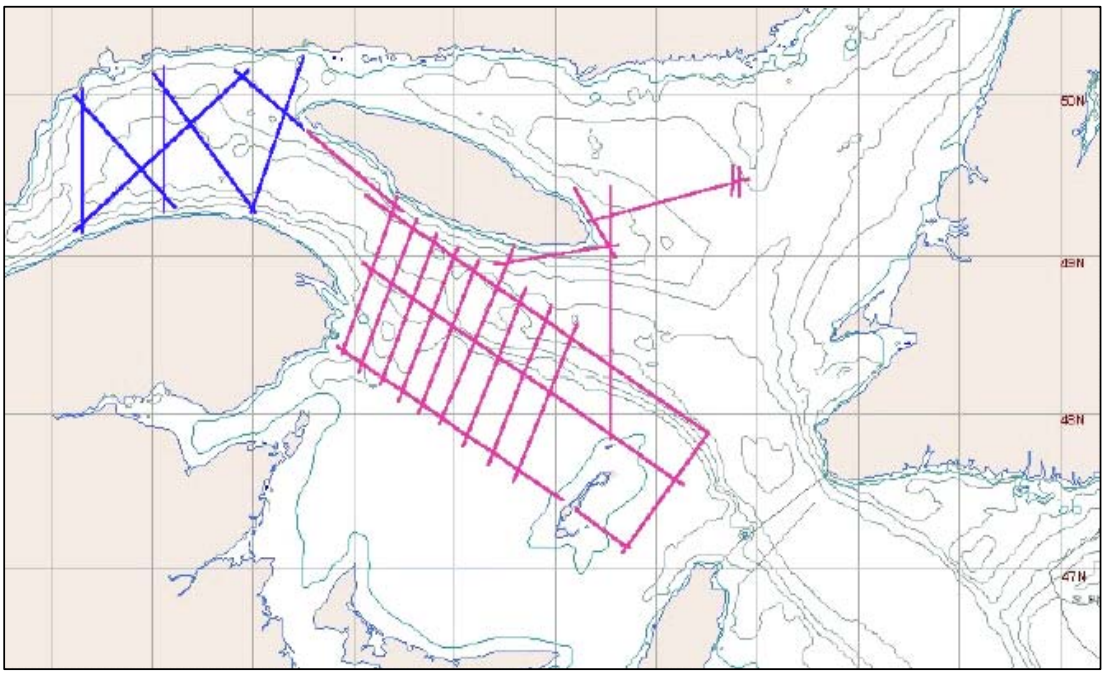
3.2.1 Exploration and Exploitation Activities Managed by the MRNFP

Offshore activities in the St. Lawrence have up-to-now been limited to seismic surveys and to one prospective drilling[7]. Since the end of the 1960s, approximately 33,000 km of seismic surveys have been done in Quebec's portion of the St. Lawrence Estuary and Gulf. After 1983, these surveys have concentrated on scientific surveys and on the Old Harry prospect, located in the Laurentian Channel about 80 km northeast of the Magdalen Islands. Recent seismic surveys reported in the Quebec portion of the Gulf of St. Lawrence were done in 1998 by *Corridor Resources* in the Old Harry sector[8]. In this campaign, approximately 200 km of surveys were done. In 2003, the Geological Survey of Canada reports that 1,250 km of seismic survey was traced in the St. Lawrence estuary between Sainte-Anne-des-Monts and Les Escoumins[9]. The MRNFP also reports that 1,733 of seismic data was obtained in August of 2004 but the precise location of this survey could not be confirmed. This data is acquired in the context of the Energy Resources - Status of Knowledge project which aims to provide a synthesis of the current state of geoscience knowledge of Canada's hydrocarbon resources.

Geophysical Service Incorporated (GSI), proposed to undertake seismic surveys in the Gulf of St. Lawrence in the zone ranging approximately within 47°10'N to 49°45'N and 60°W to 64°30'W[10]. The company also proposes to do seismic surveys at the Western end of Anticosti Island up to approximately 66°70'W (see following map). It is estimated that the 2,550 km line of seismic surveys will be done in less than one month. In order to reduce environmental impacts, the proposed period to undertake this work is the end of autumn. After evaluation by the *Bureau d'audiences publiques sur l'environnement* (BAPE), it was concluded that GSI's proposed surveys had to be postponed for various reasons. In this context, it was proposed that before future seismic surveys be undertaken in the St. Lawrence, that more scientific knowledge on habitat and environmental impacts had to be provided. Moreover, for surveys undertaken at the Western end of Anticosti Island, it was decided that the Government of Quebec had to develop an authorization process for conducting such work. Finally, permits held by Trenton Energy Inc. for exploration in the Northern part of the Gulf of St. Lawrence were suspended in December 1998[11]. Figure 3-3 shows the extent of the proposed GSI survey areas.

---

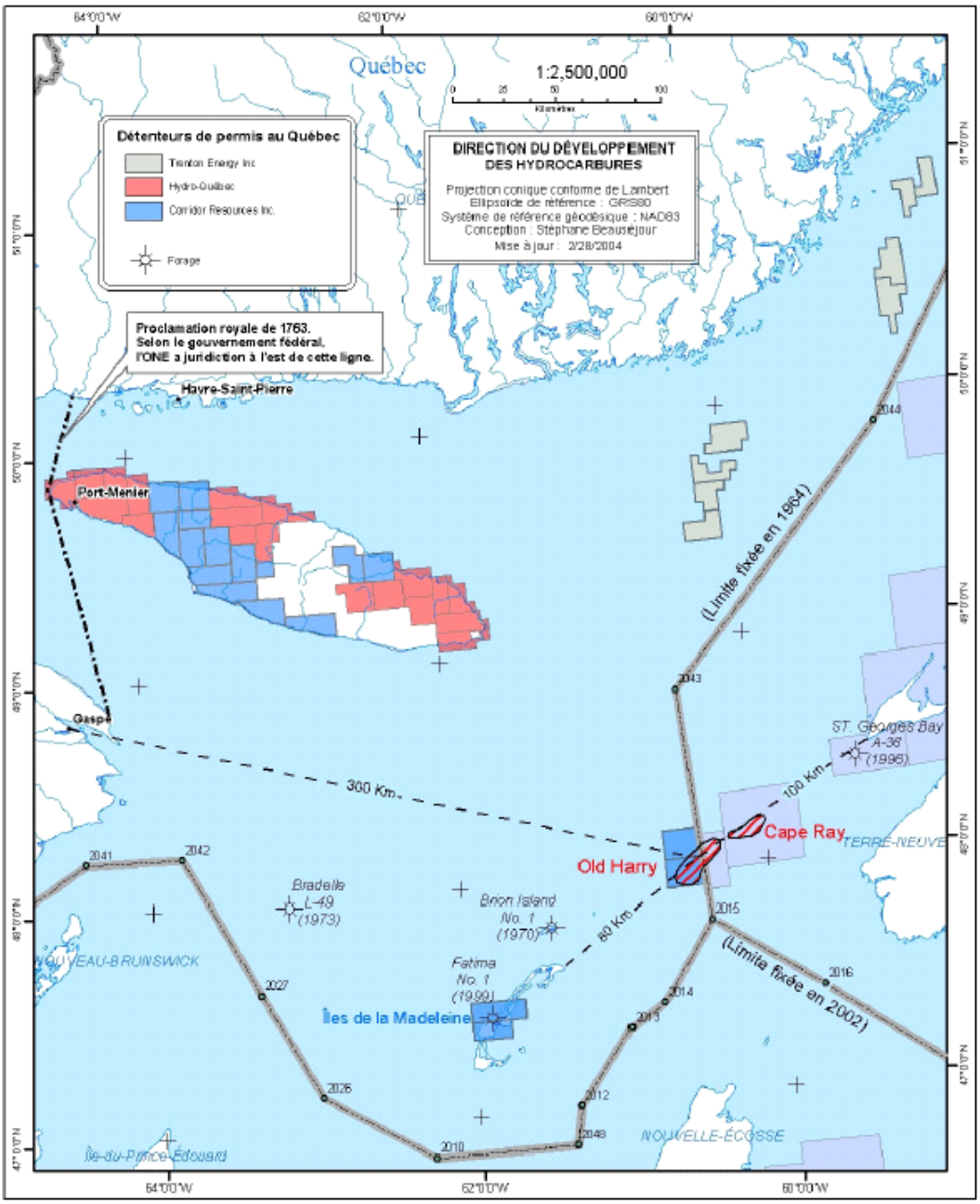
[7] BAPE, 2004, and personnal communication (29-11-04) : Jean-Yves Laliberté, coordonnateur de l'exploration, Direction du développement des hydrocarbures, MRNFP, Québec.
[8] http://www.corridor.ns.ca/properties/old_harry/index.xml
[9] CGC, 2004.
[10] Geophysical Service Incorporated (GSI), 2003.
[11] MRNFP, 2004.



Source: GSI, 2003.

Up to now, the Quebec portion of the St. Lawrence has rarely been drilled in order to confirm the presence of hydrocarbons. The most probable location for eventual drillings is in the Old Harry prospect (see Figure 3-4). This prospect is owned by *Corridor Resources* but eventual prospective drilling will need an agreement between Quebec, Newfoundland and the Federal government on provincial administrative boundaries. According to *Corridor Resources,* the prospective drilling would be located approximately at 47°59N and 60°27W. This eventual drilling is of interest because it is located just a few km (4-5) from usual navigation lines entering/leaving the Gulf of St. Lawrence by the Cabot Strait.

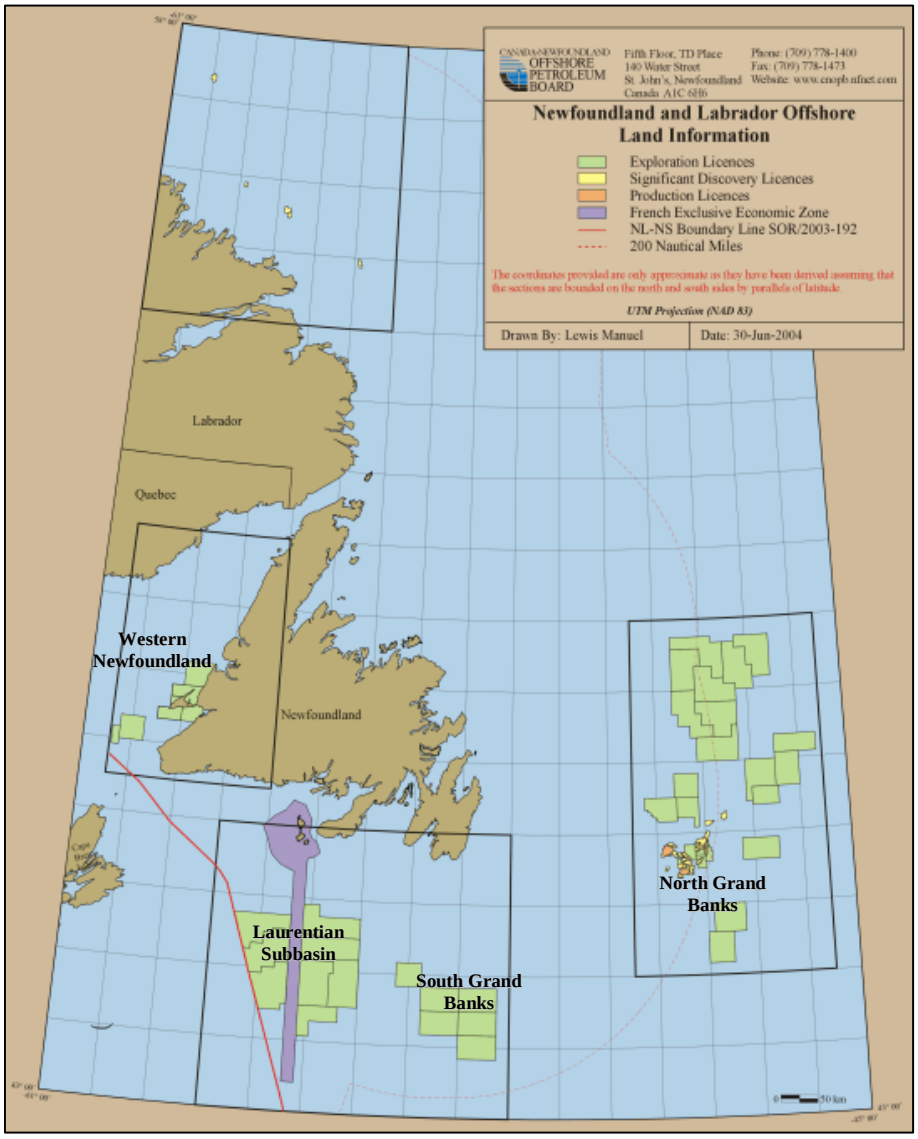
Figure 3-4
Location of the Old Harry prospect



3.2.2 Exploration and Exploitation Activities Managed by the Canada – Newfoundland Offshore Petroleum Board

The Canada – Newfoundland Offshore Petroleum Board (C-NOPB) is responsible of managing every aspect of operations in the offshore oil industry under its geographical jurisdiction. Figure 3-5 illustrates the main locations of offshore activities under the C-NOPBs jurisdiction.

Figure 3-5
Main Locations of Offshore Activities (C-NOPB)



Source: http://www.cnopb.nfnet.com/

The C-NOPB reports all seismic surveys in its jurisdiction. In the last decade (1994-2003), most of the seismic surveys were done in the South Grand Banks and North Grand Banks regions. The survey lines traced in these regions represented respectively 11% and 82% of the total km surveyed in the decade (see Table 3-1). Up to the middle of the eighties, thousands of kms of magnetic and gravity data were also acquired. In more recent years, the acquisition of this type of data was limited to the South and North Grand Banks regions. Seismic survey programs vary greatly in duration but most of them last for 3 to 5 weeks and are concentrated in the spring to autumn seasons.

Table 3-1
Seismic Surveys Conducted in the C-NOPB Jurisdiction (km by region)

	Western Newfoundland		South Grand Banks		North Grand Banks		N-E Newfoundland		Labrador		Total	
Year	2D	3D	2D	3D	2D	3D	2D	3D	2D	3D	2D	3D
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	727	0	0	0	503	62 942	0	0	0	0	1 230	62 942
1996	141	0	0	0	0	0	0	0	0	0	141	0
1997	0	0	0	0	277	74 444	0	0	0	0	277	74 444
1998	90	0	5 780	0	15 097	48 150	0	0	0	0	20 967	48 150
1999	0	0	3 309	0	13 266	153 541	0	0	0	0	16 575	153 541
2000	0	0	3 186	0	0	196 657	10 440	0	0	0	13 626	196 657
2001	0	0	6 712	65 497	1 638	77 793	6 944	0	0	0	15 294	143 290
2002	489	0	4 828	0	0	0	12 038	0	2 166	0	19 521	0
2003	0	0	0	0	0	0	4 226	13 165	1 148	0	5 374	13 165
Totals:	12 203	0	150 490	65 497	179 470	673 993	131 774	13 165	127 287	0	601 224	752 655

Many exploration wells have been and are currently being drilled[12]. In Western Newfoundland, Northeast Newfoundland, Labrador shelf and in the South Grand Banks, there is presently no drilling done and past wells have been abandoned or drilling has been suspended. Presently, active wells are all located in the North Grand Banks region. In the near future, it is expected that drilling program authorizations will be requested for the Laurentian subbasin[13].

Exploitation activities are for now limited to the Hibernia and Terra Nova oil fields. A third project, White Rose, is expected to yield its first oil by late 2005 or early 2006. Hibernia is located 315 km east of St. John's in the Jeanne D'Arc Basin. The two reservoirs (Hibernia and Ben Nevis-Avalon reservoirs) produce between 180,000 and 220,000 barrels of crude oil per day, giving Hibernia an oil production life of approximately 20 years. It is expected that natural gas will be extracted after the oil can no longer be produced economically. Once extracted and after being stored in the platform, crude oil is then transshipped via two

[12] C-NOPB, Schedule of Wells Newfoundland Offshore Area June 2004, http://www.cnopb.nfnet.com/publicat/other/sch_well/index.htm
[13] Jacques Whitford Environment Limited, 2003.

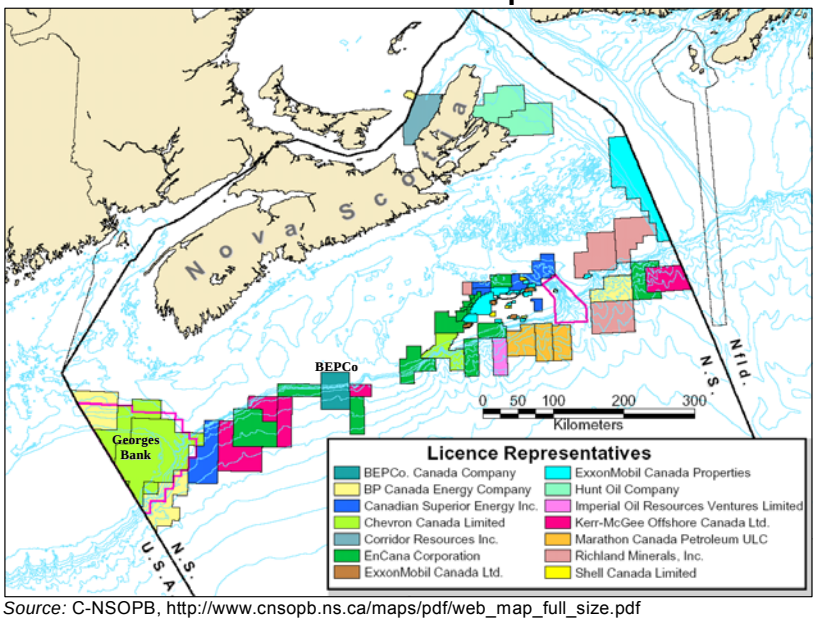
shuttle tankers to the Whiffen Head terminal in Placentia Bay[14]. Finally, Hibernia is also supplied through St. John's by three offshore support vessels[15].

Also located in the Jeanne D'Arc Basin, the Terra Nova Floating Production, Storage, and Offloading (FPSO) vessel lies approximately 35 km Southeast of Hibernia. The peak production capacity of Terra Nova is estimated at approximately 121,000 barrels per day. The crude oil is then transhipped to a shuttle tanker[16]. The White Rose project will also consist of a FPSO vessel located within a 50 km radius of the two previous extraction projects. It is expected that the FPSO will be in operation for 10 to 15 years with a peak annual average production of 92,000 barrels/day. Shuttle tanker traffic from the Terra Nova FPSO and the eventual White Rose FPSO will depend on the demand of crude, distance to client and availability of storage. Finally, all maritime traffic likely to transit within a 10 nautical mile (18 km) radius of the Terra Nova FPSO is advised to contact it and to follow instructions.

3.2.3 Exploration and exploitation activities managed by the Canada – Nova Scotia Offshore Petroleum Board

As with the C-NOPB, the Canada – Nova Scotia Offshore Petroleum Board (C-NSOPB) has jurisdiction over offshore activities within its geographical jurisdiction. Figure 3-6 illustrates the active exploration licences in the Nova Scotia offshore area. Exploration and exploitation activities in the Georges Bank region are under moratorium up to 2012.

Figure 3-6
Nova Scotia Active Exploration Licences



Source: C-NSOPB, http://www.cnsopb.ns.ca/maps/pdf/web_map_full_size.pdf

[14] This precise traffic is included in part 1 of this report.
[15] Ibid.
[16] Ibid.

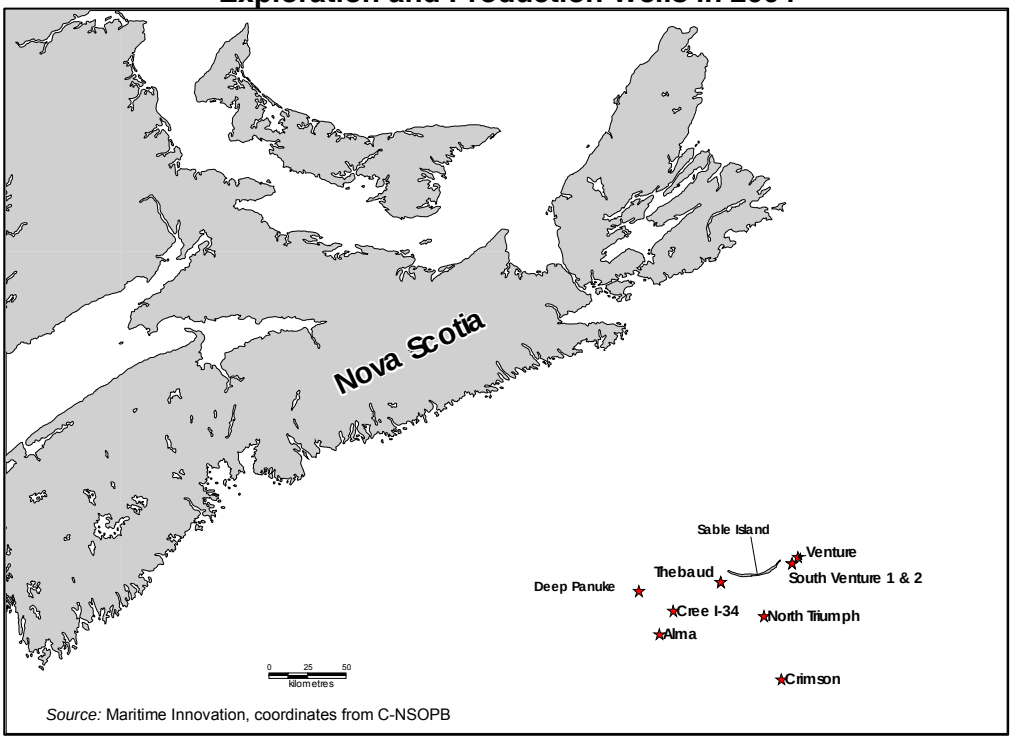
The length and number of seismic surveys in the jurisdiction of the C-NSOPB varies greatly from year to year. As it can be seen in Table 3-2, approximately 100,000 km of 2D and 21,700 km2 of 3D surveys have been traced in the last five years. Surveys done in 2004 were very few compared to previous years.

Table 3-2
Seismic Surveys traced in the C-NSOPB Jurisdiction (km)

Year	2D	3D (km^2)	Total
2000	55 677	11 730	67 407
2001	16 150	4 808	20 957
2002	10 541		10 541
2003	15 771	4 765	20 536
2004	764	353	1 117
Total	98 902	21 656	120 558

In 2004, two development wells and two exploration wells were drilled. All these wells were abandoned or drilling was suspended. As of the end of October 2004, 13 wells were producing in the Sable Offshore Energy Project (SOEP). The development and exploration wells were South Venture 1 and 2, Crimson and Cree I-34. The SOEP fields with producing wells were Thebaud, Alma, Venture and North Triumph. Figure 3-7 shows the location of these wells.

Figure 3-7
Exploration and Production Wells in 2004



Source: Maritime Innovation, coordinates from C-NSOPB

The SOEP consists of 6 gas fields and began production at the end of 1999. The life expectancy of the project is 25 years. The gas is sent to the mainland through a subsea pipeline. Traffic generated by supply and support vessels is included in Section 1 of this report.

Future projects which fall under the jurisdiction of the C-NSOPB are located within BEPCo's licence area (see Figure 3-6) and at the Deep Panuke field. Exploratory drilling in BEPCo's licence area is expected to extend through the years 2005 to 2009[17]. For the Deep Panuke field, EnCana adjourned the regulatory development process to review the project's economics[18].

[17] Jacques Whitford Environment Limited, 2004
[18] *Source :* EnCana.ca

4 Traffic Summary by Area

4.1 AREA 1: 200 MILE LIMIT TO CABOT STRAIT

The summary of passing traffic in Area 1 is presented in Table 4-1.

Table 4-1
Summary of Passing Traffic in Area 1

Type / DWT Class	S-E	N-W	N-E	S-W	None	E	S	W	N	Total
Ferry										
< 10 000	41	40	1,006	1,001	1,122					3,210
Fishing										
< 10 000	1,389	1,157	1,412	1,451	316		1		1	5,727
Tug										
< 10 000	1,663	1,656	696	647	989		1			5,652
Tanker										
< 10 000	252	230	132	135	11					760
10 - 19 999	113	86	256	208	14					677
20 - 29 999	26	33	83	76	1					219
30 - 39 999	49	53	351	260	9					722
40 - 49 999	64	97	186	143	6					496
50 - 59 999	5	6	10	7						28
60 - 69 999	29	27	44	33	2					135
70 - 79 999	9	6	7	10						32
80 - 89 999	7	10	11	13	1					42
90 - 99 999	6	19	151	147	4					327
100 - 109 999	9	17	75	65	2					168
110 - 119 999	9	5	28	38	1					81
120 - 129 999	144	145	10	7	1	10				317
130 - 139 999	11	8	3	6						28
140 - 149 999	67	50	20	37	2					176
150 - 159 999	23	18	34	26	2					103
160 - 169 999	4	4	7	6						21
250 - 259 999	1	2								3
270 - 279 999	9	9	2	2	1					23
280 - 289 999	2	4		1						7
290 - 299 999	12	15	11	9						47
300 - 309 999	23	26	24	16	4					93
310 - 319 999	3	3	3	1	1					11
320 - 329 999	1	1								2
Special purpose										
< 10 000	618	600	394	422	1,450	7		4	3	3,498
10 - 19 999			1							1
20 - 29 999	15	13		1						29
50 - 59 999	1		2	2						5
Barge										
< 10 000	15	24	13	11	21					84
10 - 19 999			1							1

Table 4-1 (continued)

Type / DWT Class	S-E	N-W	N-E	S-W	None	E	S	W	N	Total
Dry bulk										
< 10 000	24	21	61	52	1					159
10 - 19 999	116	69	151	125	9					470
20 - 29 999	218	164	70	55	1					508
30 - 39 999	244	172	155	141	1					713
40 - 49 999	91	44	136	82	2					355
50 - 59 999	17	11	5	12	2					47
60 - 69 999	47	40	31	41	1					160
70 - 79 999	110	116	89	89	1					405
80 - 89 999	1		1							2
120 - 129 999	5	5		1						11
130 - 139 999	10	9		2						21
140 - 149 999	12	10	3	4						29
150 - 159 999	9	8		1						18
160 - 169 999	13	10	2	4						29
170 - 179 999	25	28	9	8	1					71
210 - 219 999	8	7	7	7						29
Container										
< 10 000	101	83	264	262	3					713
10 - 19 999	120	167	120	120	4					531
20 - 29 999	24	58		34						116
30 - 39 999	125	46	31	111	1					314
40 - 49 999	85	39	87	117						328
50 - 59 999	44	63	157	159						423
60 - 69 999	57	78	105	181	1					422
General cargo										
< 10 000	261	155	237	285	9					947
10 - 19 999	142	82	201	134	3					562
20 - 29 999	31	7	62	31	1					132
30 - 39 999	26	27	12	14	3					82
40 - 49 999	14	21	36	34						105
50 - 59 999	4	6	6	13						29
Passenger										
< 10 000	96	92	280	276	375					1,119
10 - 19 999	15	8	34	41						98
60 - 69 999	2	2	4							8
Ro-Ro										
< 10 000	19	16	145	157	2					339
10 - 19 999	17	26	62	155	1					261
20 - 29 999		6	1	48	2					57
30 - 39 999	3		19							22
40 - 49 999	2	1	4	6						13
Chemical										
< 10 000	52	47	12	22		1		2		136
10 - 19 999	79	44	34	55	3					215
20 - 29 999	10	7	6	13						36
30 - 39 999	17	28	19	22						86
40 - 49 999	30	24	32	29	1					116
Yacht										
< 10 000	27	44	37	54	6					168
Dredge										
< 10 000	25	25	18	23	49		1			141
60 - 69 999	5	4								9
OBO										
20 - 29 999	1		2	1						4
40 - 49 999	1	1	3	2						7
50 - 59 999	2	1	1							4
60 - 69 999	1		2	3						6
70 - 79 999	8	16	5	8	1					38
80 - 89 999	1	3		1						5
90 - 99 999			1	1						2
100 - 109 999	2	1	15	14						32
150 - 159 999	1	1								2
160 - 169 999	2	4	2	1						9
170 - 179 999	1	1								2
Military										
< 10 000	9	9	1	5						24
LNG										
10 - 19 999				1						1
60 - 69 999	1	1								2
LASH										
< 10 000					3					3
Hovercraft										
< 10 000			1							1
Total	**7,033**	**6,322**	**7,751**	**7,838**	**4,447**	**18**	**3**	**6**	**4**	**33,422**

As mentioned in previous sections, the passages identified as being made by LNG vessels were actually made by LPG vessels.

All traffic entering Area 1 will normally integrate into the normal navigation routes while traffic already in the Area is expected to stay in those routes. Sometimes, these routes cross but it is normal navigation practice not to cross other vessels unless being offshore and not in navigation routes. To enter into the Gulf of St Lawrence, one potential crossing zone, or node, is located at the Eastern end of the Belle Isle Strait approximately between calling points 3A (51°43'N-56°07'N), 3B (51°39'N-56°04'W) , 2C (51°54'N-55°46'W) 2D (51°52'N-55°41'W) 2A (51°48'N-55°38'W) and 2B (51°44'N-55°37'W). Within this specific zone, vessels required to comply with the Vessel Traffic Services Zones Regulations are requested to participate in the Belle Isle Vessel Traffic Services Zone. Fishing vessels are encouraged to maintain a listening watch or contact "Belle Isle Traffic".

Crossing traffic also consists of the ferries transiting from Nova Scotia to Newfoundland in the Strait of Canso (Marine Atlantic) and the ferries crossing in the Bay of Fundy. Supply vessels and shuttle tankers servicing exploitation activities off Nova Scotia and Newfoundland also integrate into normal navigation routes. In the case of the Marine Atlantic service, 1,778 crossings were recorded in 2003.

Overtaking in navigation routes is not frequent. Nonetheless, some types of vessels have normal speeds that are faster than others. In that sense, Table 4-2 lists vessels types and the average maximum speed of the vessels that were reported in all the areas analysed in this report. In general, dry bulk vessels and tankers sail at similar speeds while containerships will be faster. Barges have very slow speeds because most are not motorised and are assisted by tug boats.

Table 4-2
Average Maximum Speed for Commercial Vessels in Eastern Canada

Type / DWT Class	Average max speed (knots)
Barge	
< 10 000	3,2
10 - 19 999	0,6
20 - 29 999	0,0
Chemical	
< 10 000	12,1
10 - 19 999	14,0
20 - 29 999	14,7
30 - 39 999	15,0
40 - 49 999	14,6
Container	
< 10 000	14,5
10 - 19 999	18,2
20 - 29 999	17,2
30 - 39 999	21,0
40 - 49 999	20,5
50 - 59 999	21,8
60 - 69 999	22,7
Dredge	
< 10 000	4,3
60 - 69 999	16,0
Dry bulk	
< 10 000	13,1
10 - 19 999	13,6
120 - 129 999	14,3
130 - 139 999	14,0
140 - 149 999	13,9
150 - 159 999	14,4
160 - 169 999	14,1
170 - 179 999	13,9
20 - 29 999	14,3
210 - 219 999	15,0
30 - 39 999	13,7
40 - 49 999	14,3
50 - 59 999	13,9
60 - 69 999	14,0
70 - 79 999	14,1
80 - 89 999	14,3
90 - 99 999	16,0
Ferry	
< 10 000	13,3
Fishing	
< 10 000	11,3
General cargo	
< 10 000	14,0
10 - 19 999	15,6
20 - 29 999	17,3
30 - 39 999	13,5
40 - 49 999	15,1
50 - 59 999	15,2
Hovercraft	
< 10 000	22,5
Hydrofoil	
< 10 000	25,5
LASH	
< 10 000	1,0
LNG	
10 - 19 999	16,0
20 - 29 999	17,0
60 - 69 999	14,0

Type / DWT Class	Average max speed (knots)
OBO	
100 - 109 999	14,0
150 - 159 999	14,0
160 - 169 999	14,0
170 - 179 999	13,0
20 - 29 999	14,8
40 - 49 999	6,5
50 - 59 999	15,5
60 - 69 999	14,0
70 - 79 999	14,2
80 - 89 999	13,0
90 - 99 999	16,0
Passenger	
< 10 000	15,0
10 - 19 999	24,8
60 - 69 999	21,0
Ro-ro	
< 10 000	15,5
10 - 19 999	17,8
20 - 29 999	18,8
30 - 39 999	20,3
40 - 49 999	19,8
Special purpose	
< 10 000	12,8
10 - 19 999	15,0
20 - 29 999	13,0
50 - 59 999	7,0
Tanker	
< 10 000	11,4
10 - 19 999	12,9
100 - 109 999	14,1
110 - 119 999	14,6
120 - 129 999	14,3
130 - 139 999	9,5
140 - 149 999	14,4
150 - 159 999	14,0
160 - 169 999	15,3
20 - 29 999	14,3
250 - 259 999	16,0
270 - 279 999	15,0
280 - 289 999	14,0
290 - 299 999	14,9
30 - 39 999	14,8
300 - 309 999	14,7
310 - 319 999	16,0
320 - 329 999	15,0
40 - 49 999	13,9
50 - 59 999	15,2
60 - 69 999	14,5
70 - 79 999	14,5
80 - 89 999	14,4
90 - 99 999	13,6
Tug	
< 10 000	11,9
Yacht	
< 10 000	11,4

As mentioned in previous sections, the passages identified as being made by LNG vessels were actually made by LPG vessels.

4.2 AREA 2: GULF OF ST. LAWRENCE

Table 4-3 presents the number, type, DWT class and direction for passages made in Area 2 in 2003.

Table 4-3
Summary of Passing Traffic in Area 2

Type / DWT Class	S-E	S-W	N-E	N-W	None	N	Total
Dry Bulk							
< 10 000	13	2	6	10			31
10 - 19 999	61	19	17	39			136
20 - 29 999	211	100	116	156	3		586
30 - 39 999	227	100	112	166			605
40 - 49 999	53	9	32	25			119
50 - 59 999	15	41	41	9			106
60 - 69 999	43	10	3	37			93
70 - 79 999	100	41	34	118	1		294
80 - 89 999	1		1				2
120 - 129 999	5	1		5			11
130 - 139 999	10	2		9			21
140 - 149 999	12	4	3	11			30
150 - 159 999	9	1		8			18
160 - 169 999	13	4	2	11			30
170 - 179 999	25	8	9	28			70
210 - 219 999	8	7	7	7			29
Ferry							
< 10 000	30	311	311	40	173		865
General cargo							
< 10 000	170	153	126	98			547
10 - 19 999	97	82	114	49			342
20 - 29 999	36	19	44	5			104
30 - 39 999	19	4	7	13	1		44
40 - 49 999	3	5	2	4			14
50 - 59 999	1	3		1	1		6
Container							
< 10 000	7	59	57	7	1		131
10 - 19 999	54	39	2	88			183
20 - 29 999	1			1			2
30 - 39 999	124	109	29	45			307
40 - 49 999	53	86	42	8			189
Tanker							
< 10 000	23	26	23	14	1		87
10 - 19 999	72	80	63	48	3		266
20 - 29 999	17	8	4	7			36
30 - 39 999	20	7	50	23			100
40 - 49 999	24	7	3	14			48
50 - 59 999	4	1		3			8
60 - 69 999	23	5	5	18			51
70 - 79 999	5	3	1	2			11
80 - 89 999	4			5			9
110 - 119 999		1					1
130 - 139 999	11	3		8			22
140 - 149 999	55	22		34			111
150 - 159 999	7	2		4			13
160 - 169 999	1	1					2

Table 4-3 (continued)

Type / DWT Class	S-E	S-W	N-E	N-W	None	N	Total
Tug							
< 10 000	180	146	145	176	6		653
Special purpose							
< 10 000	94	78	73	73	43	1	362
Chemical							
< 10 000	21	7	2	18			48
10 - 19 999	74	50	32	34			190
20 - 29 999	7	4	2	2			15
30 - 39 999	13	2	3	14			32
40 - 49 999	20	8	1	13			42
Passenger							
< 10 000	81	86	71	68	2		308
10 - 19 999	1			1			2
60 - 69 999	2			2			4
Ro-Ro							
< 10 000	12	12	14	9			47
10 - 19 999	17	50	56	6			129
Fishing							
< 10 000	7	41	44	4			96
Barge							
< 10 000	1		4	2	54		61
Yacht							
< 10 000	16	9	10	8	2		45
OBO							
170 - 179 999	1			1			2
20 - 29 999	1	1	2				4
50 - 59 999	1			1			2
60 - 69 999	1	1					2
70 - 79 999	6	1	3	5			15
100 - 109 999	1			1			2
150 - 159 999	1			1			2
160 - 169 999	1		2	3			6
Hovercraft							
< 10 000	1		1	1			3
LNG							
10 - 19 999		1					1
60 - 69 999	1			1			2
Military							
< 10 000			2				2
Dredge							
< 10 000	1						1
Total	**2,229**	**1,882**	**1,733**	**1,622**	**291**	**1**	**7,758**

As mentioned in previous sections, the passages identified as being made by LNG vessels were actually made by LPG vessels.

Regarding crossing traffic, there are three navigation route nodes in the Gulf of St. Lawrence. One of them is North-East of the Magdalene Islands in the zone surrounding 48°N-61°W. The other two are located at the North-West end of Anticosti Island in the zone surrounding 50°N-64°30'N and South-West of Anticosti Island in the zone surrounding 49°15'N-64°15'W.

The ferry from Newfoundland to Québec in the Strait of Belle Isle (St Barbe to Blanc Sablon) can also be considered to be crossing traffic. In 2003, 237 crossings were reported by the MCTS while the 2004 ferry schedule reported that approximately 430 departures from St. Barbe.

4.3 AREA 3: ST. LAWRENCE ESTUARY FROM LES ESCOUMIINS TO 66W

Table 4-4 summarises vessel passages in Area 3 during 2003.

Table 4-4
Summary of Passing Traffic in Area 3

Type / DWT Class	Downbound	Upbound	None	Total
Ferry				
< 10 000	2 099	2 059	11	4 169
Dry bulk				
< 10 000	18	11		29
10 - 19 999	82	56		138
20 - 29 999	514	401	6	921
30 - 39 999	610	492	8	1 110
40 - 49 999	94	30	2	126
50 - 59 999	66	53		119
60 - 69 999	59	49		108
70 - 79 999	151	157	2	310
80 - 89 999	2			2
120 - 129 999	5	6		11
130 - 139 999	13	11		24
140 - 149 999	17	15		32
150 - 159 999	10	9		19
160 - 169 999	18	15	1	34
170 - 179 999	39	36		75
210 - 219 999	18	14		32
Tug				
< 10 000	269	263	1 194	1 726
General cargo				
< 10 000	249	188	2	439
10 - 19 999	147	83	2	232
20 - 29 999	44	28		72
30 - 39 999	23	16		39
40 - 49 999	3	1		4
50 - 59 999	1	1		2
Container				
< 10 000	65	60		125
10 - 19 999	53	52		105
20 - 29 999	1	1		2
30 - 39 999	155	154		309
40 - 49 999	95	94		189
Special purpose				
< 10 000	276	295	113	684
Tanker				
< 10 000	33	31	1	65
10 - 19 999	123	105		228
20 - 29 999	21	15		36
30 - 39 999	19	20	1	40
40 - 49 999	27	20		47
50 - 59 999	4	4		8
60 - 69 999	22	15		37
70 - 79 999	4	1		5
130 - 139 999	11	11		22
140 - 149 999	55	56		111
150 - 159 999	7	7		14
160 - 169 999	1	1		2

Table 4-4 (continued)

Type / DWT Class	Downbound	Upbound	None	Total
Chemical				
< 10 000	15	14		29
10 - 19 999	112	86		198
20 - 29 999	9	4		13
30 - 39 999	16	16		32
40 - 49 999	21	21		42
Passenger				
< 10 000	105	97	102	304
10 - 19 999	1	1		2
60 - 69 999	2	2		4
Ro-ro				
< 10 000	27	19	44	90
10 - 19 999	64	55		119
Barge				
< 10 000	8	11	42	61
Yacht				
< 10 000	25	25	3	53
OBO				
20 - 29 999	3	1		4
50 - 59 999	1	1		2
60 - 69 999	1	1		2
70 - 79 999	14	7		21
100 - 109 999	1	1		2
150 - 159 999	1	1		2
160 - 169 999	4	3		7
170 - 179 999	1	1		2
Fishing				
< 10 000	6	5	12	23
Military				
< 10 000	9	10		19
Hovercraft				
< 10 000	2	2		4
Dredge				
< 10 000	2		1	3
LNG				
60 - 69 999	1	1		2
Hydrofoil				
< 10 000	1			1
Total	**5 975**	**5 321**	**1 547**	**12 843**

As mentioned in previous sections, the passages identified as being made by LNG vessels were actually made by LPG vessels.

In Area 3, there are 2 nodes and 4 ferry services capable of generating crossing traffic. The first node is located in the approach to the Bay of Sept-Îles while the second is approximately located in front of Pointe-des-Monts (49°14'N-67°10W). For ferry services, the MCTS reports 1,588 departures for the Matane – Baie-Comeau – Godbout ferry, 874 departures for the Matane – Baie-Comeau rail-ferry, 984 departures for the Rimouski – Forestville ferry and 593 departures for the Trois-Pistoles – Les Escoumins ferry.

4.4 AREA 4: CAP-AUX-OIES TO LES ESCOUMINS

Table 4-5 summarises vessel passages in Area 4 during 2003.

Table 4-5
Summary of Passing Traffic in Area 4

Type / DWT Class	Downbound	Upbound	None	Total
Dry bulk				
< 10 000	10	9		19
10 - 19 999	69	55		124
20 - 29 999	391	363		754
30 - 39 999	463	428		891
40 - 49 999	33	22		55
50 - 59 999	56	51	1	108
60 - 69 999	24	21		45
70 - 79 999	57	62	1	120
120 - 129 999	1	1		2
130 - 139 999	3	3		6
140 - 149 999	1	1		2
160 - 169 999	1	1		2
Passenger				
< 10 000	171	180	393	744
10 - 19 999	1	1		2
60 - 69 999	2	2		4
Container				
< 10 000	61	59		120
10 - 19 999	53	52		105
20 - 29 999	1	1		2
30 - 39 999	153	154		307
40 - 49 999	95	94		189
General cargo				
< 10 000	173	155		328
10 - 19 999	93	73		166
20 - 29 999	19	17		36
30 - 39 999	14	13		27
50 - 59 999	1	1		2
Tanker				
< 10 000	31	30		61
10 - 19 999	87	82		169
20 - 29 999	19	15		34
30 - 39 999	10	10		20
40 - 49 999	25	18		43
50 - 59 999	4	4		8
60 - 69 999	16	13		29
70 - 79 999	2	1		3
130 - 139 999	12	12		24
140 - 149 999	55	57		112
150 - 159 999	7	7		14
160 - 169 999	1	1		2

Table 4-5 (continued)

Type / DWT Class	Downbound	Upbound	None	Total
Special purpose				
< 10 000	132	120	98	350
Ferry				
< 10 000	39	37	274	350
Chemical				
< 10 000	15	14		29
10 - 19 999	93	73		166
20 - 29 999	9	4		13
30 - 39 999	16	16		32
40 - 49 999	21	21		42
Tug				
< 10 000	103	94	1	198
Ro-ro				
< 10 000	13	13		26
10 - 19 999	56	54		110
Yacht				
< 10 000	22	19	4	45
Barge				
< 10 000	6	3	22	31
Military				
< 10 000	6	6		12
Fishing				
< 10 000	7	1		8
OBO				
20 - 29 999	1	1		2
70 - 79 999	1			1
LNG				
60 - 69 999	1	1		2
Dredge				
< 10 000	2			2
Hydrofoil				
< 10 000	1	1		2
Hovercraft				
< 10 000	1	1		2
Total	**2 760**	**2 548**	**794**	**6 102**

As mentioned in previous sections, the passages identified as being made by LNG vessels were actually made by LPG vessels.

The mouth of the Saguenay River can potentially generate crossing traffic between vessels coming down river and sailing towards Les Escoumins and vessels coming down the St. Lawrence and then going up the Saguenay. Crossing traffic is also generated by the Tadoussac to Baie-Saint-Catherine ferry and from the Rivière-du-Loup to Saint-Siméon ferry. The MCTS reported that the latter generated 333 passages in 2003.

5 References

Bureau d'audiences publiques sur l'environnement (BAPE), 2004, *Les enjeux reliés aux levés sismiques dans l'estuaire et le golfe Saint-Laurent.* Rapport d'enquête et d'audiences publiques 193. BAPE, Québec, 128 pages.

Canadian Hydrographic Service, 2004, *Annual Edition April 2004. Notices to Mariners 1 to 46. Minister of Fisheries and Oceans Canada, Ottawa.* Document available on Internet at: http://www.notmar.gc.ca/eng/services/2004_annual_e/table_of_contents_e.php

Commission géologique du Canada, Bureau du Québec et Atlantique, Secteur des sciences de la terre. 2004. *Levés sismique réflexion – utilité critique pour la connaissance scientifique.* www.bape.gouv.qc.ca/sections/ mandats/sismiques/documents/DB2.pdf

Comité d'experts sur les enjeux environnementaux liés aux levés sismiques dans l'estuaire et le golfe du Saint-Laurent, 2004, Rapport du Comité d'experts. Québec, 189 pages.

Fisheries and Oceans Canada. 2002. *Atelier scientifique sur les mammifères marins, leurs habitats et leurs ressources alimentaires dans le cadre de l'élaboration du projet de zone de protection marine de l'estuaire du Saint-Laurent du 3 au 7 avril 2000.* Institut Maurice Lamontagne, Mont-Joli, 345 pages.

Geophysical Service Incorporated (GSI), 2003, *GSI West Gulf of St. Lawrence Survey 2003.* Report prepared by Canning and Pitt Associates Inc. assisted by Robert Hamelin & associés. Calgary. 339 pages + appendices.

Jacques Whitford Environment Limited, 2004, *Environmental Assessment Report. Exploratory Drilling on EL 2407.* Report prepared for BEPCo Canada Company. Darthmouth,

Jacques Whitford Environment Limited, 2003, *Strategic Environmental Assessment – Laurentian Subbasin.* Final report submitted to the C-NOPB, St. John's, 250 pages + appendices.

Michaud, R., Bédard, C., Mingelbier, M. and Gilber, M.-C. 1997. *Les activités d'observation en mer des Cétacés dans l'estuaire du Saint-Laurent 1985-1996: une étude de la répartition spaciale des activités et des facteurs favorisant la concentration des bateaux sur les sites d'observation.* Rapport final présenté à Parcs Canada par le GREMM, Tadoussac, 17 pages + Appendices.

Ministère des Ressources naturelles, de la Faune et des Parcs, 2004, *Rapport annuel. Activités d'exploration pétrolière et gazière au Québec.* MRNFP, Québec, 22 pages.

Fisheries and Oceans Canada, 2004. Oceans Program Activity Tracking (OPAT). http://www.dfo-mpo.gc.ca/canwaters-eauxcan/oceans/opat-orapo/index_e.asp

Fisheries and Oceans Canada, 2004. Fish Habitat Management Information System (FHAMIS). http://sighap-fhamis.qc.dfo-mpo.gc.ca

Fisheries and Oceans Canada, 2004. Canadian Advisory Secretariat (CSAS): Fishing areas. http://www.dfo-mpo.gc.ca/csas/Csas/English/Resources/Maps_e.htm

Sepaq, 2004. La Société des établissements de plein air du Québec http://www.sepaq.com/index.html