5.0 Cumulative Effects

Cumulative effects are those effects that are additive (or possibly greater) within a project or with other outside existing or planned projects. Planned projects have to have a reasonable chance of proceeding (e.g., may be in the approval process). Guidance on cumulative effects assessment is available from the Canadian Environmental Assessment Agency (CEA Agency) (1994, 1999).

Analysis of historical experience in the Newfoundland and Labrador offshore area indicated that (to the end of 2008) 23 significant discoveries were made as a result of 139 "wildcat" exploration wells - a proportion of about 16.5% or 1 in 5.6. (C-NLOPB 2009, pers. comm.). Of these discoveries, four to date (Hibernia, Terra Nova, White Rose and the potential Hebron development) resulted in more than one delineation well (approximately 3% of exploration wells or 1 in 32). Full pre-development field delineation offshore Newfoundland and Labrador to 2005 involved seven to nine wells in addition to the initial discovery well; this drilling typically has extended considerably beyond the nine-year period of the original exploration licence.

Given today's high oil prices and worldwide demand for oil and gas, it is difficult to predict future levels of offshore activity based upon past history. Nonetheless, given the relatively small area covered by the parcels in question, what is known of past decisions offshore Newfoundland, and other factors, the following may be a reasonable scenario for the SEA Area.

There likely would be no more than two seismic programs running concurrently. This is deduced based on past history, the high demand for seismic vessels, the need to maintain distance to avoid affecting each other's data, and the general propensity of the oil industry to utilize resources sequentially to realize potential cost savings. There likely would be no more than two exploratory drill rigs (one shallow and one deep), excluding any drilling from land, operational at any one time. This is deduced based on past history, the high demand for drill rigs, and the general propensity of the oil industry to utilize resources sequentially to realize potential cost savings. There is typically no more than two exploratory wells drilled per parcel; given that there are four parcels and that exploration licences typically last for five years then one may see eight wells over five years plus whatever activity existing licences may generate over the next few years. In the statistically unlikely event that enough significant discoveries are made to justify a production development, one would be the maximum number.

If a production development was proposed it can be speculated that in shallow water, less than 100 metres, a bottom-founded unit might be used, whereas in deeper water an FPSO might be used. Production platforms would be tied into an unknown number of satellite wells with flow lines. Production developments could also be on land if directional drilling was used.

Within-project cumulative effects are normally integrated within a site-specific EA as part of the effects predictions which avoids double accounting. In the SEA Area, the key exterior factors include:

- Other oil and gas activities;
- Fisheries and aquaculture;
- Marine transportation (e.g., cargo and tankers);
- Hunting;
- Tourism;
- Military exercises; and
- Subsea cables.

Other factors that may need to be considered for inshore projects are those associated with recreation and culture such as recreational fisheries, boating and kayaking, pleasure cruises, and cultural and archaeological sites. Some of these are discussed in more detail below.

5.1 Oil and Gas Activities

Potential activities include those associated with exploration, production, and decommissioning. Some of these are discussed below with emphasis on the exploratory phase which is less speculative than the others which may or may not occur 20+ years hence.

5.1.1 Seismic Surveys

Any geophysical programs (2-D, 3-D, VSP, or other) will not overlap as they would interfere with data collection. Effects of noise may be additive on those animals such as certain species of fish (e.g., herring) and marine mammals (e.g., humpback whales) that may be sensitive to seismic survey noise. Some migratory animals may be subject to disturbance from noise from other surveys outside the SEA Area on the East Coast. Mitigations such as ramp-ups and avoidance of sensitive areas and times should mitigate any potential cumulative effects to acceptable levels.

Considering that environmental assessments to date have predicted that the effects of individual seismic programs on marine animals (e.g., marine mammals, marine birds, sea turtles, fish, and invertebrates) are not likely significant, given the proper implementation of mitigation measures (Davis et al. 1998; Buchanan et al. 2004; Christian et al. 2005), and that spatial and temporal overlap between different seismic programs can be readily minimized, seismic cumulative effects should be minimal. Nonetheless, individual seismic programs will require a site-specific EA pursuant to *CEAA* which will examine cumulative effects in detail. The more detailed cumulative effects assessment, including background noise levels, would be contained in the site-specific EA. Standard mitigations such as a marine mammal monitoring program, ramp-up procedures and the use of FLOs are typically employed by operators to reduce potential effects.

5.1.2 Drilling

Any cumulative effects will not be overlapping or synergistic within the SEA Area, unless supply vessels follow the same routes at the same time. Cumulative effects will, however, be additive; this is a potential issue with migratory species that may be subject to repeated disturbances as they transit the South and East coasts. Any cumulative effects on the SEA Area's ecosystem from routine exploratory drilling in the SEA Area will probably not overlap in time and space and thus, while additive will not be multiplicative. This level of activity will not change any effects predictions when viewed on a cumulative basis unless significant oil spills or blowouts occur.

Barring major accidents, effects of a single exploratory well in the SEA Area should be minimal (see Buchanan et al. 2003; Buchanan et al. 2006, 2007). In any event, it is unlikely that any effects, mostly confined to within 500 m, would overlap with another exploratory well, on or off the shelf; they will be simply additive. An exception could be the effects of drill rig noise and/or supply vessel noise.

5.2 Commercial, Research and Recreational Fisheries and Aquaculture

Some parts of the SEA Area undergo intensive fishing activity (Subsection 3.3). With the possible exception of major oil spills, the environmental effects of trawling on benthos and fish, the effects of longlines and gillnets on fish populations, seabirds, sea turtles, and marine mammals likely exceed the potential effects from oil and gas exploration and production. Nonetheless, effects of exploration and production activities may add some additional stress on fish and fisheries.

DFO and industry fisheries research surveys normally involve only a few vessels operating in specific areas for relatively short periods of time relative to commercial fleet activity. As such, such surveys probably have relatively small contributions to overall cumulative effects.

Fishing is deeply rooted in Newfoundland and Labrador culture and is a popular recreational activity for residents and tourists alike. Three species are targeted recreationally on Newfoundland's south coast: Atlantic salmon; sea-run trout (*Salvinus fontinalis*); and Atlantic cod. Grandy's River and Grey River are two of the most productive

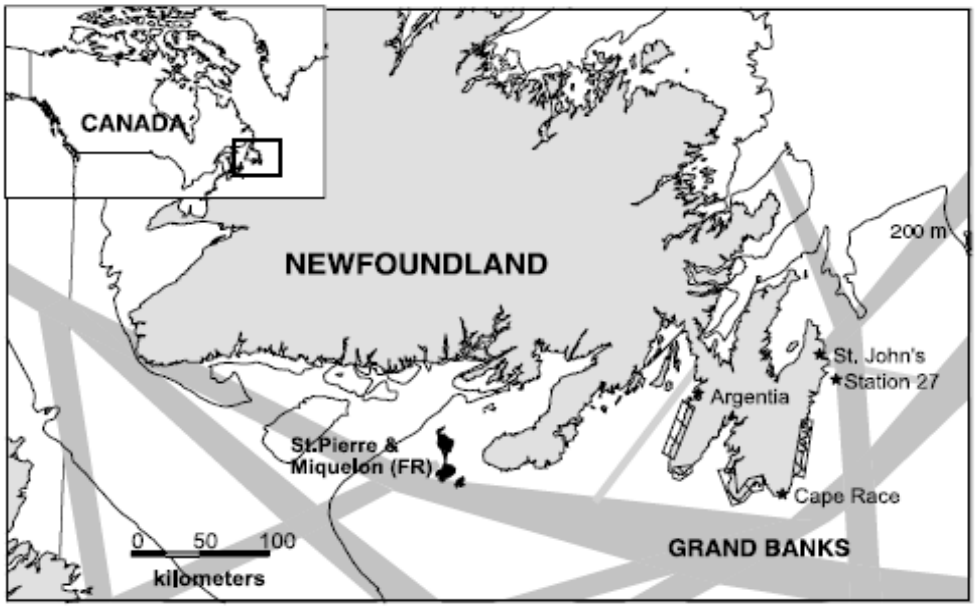
salmon rivers on the south coast and both draw anglers from around the province and around the world (JW 2007). Sea-run trout are also a favoured target species for anglers and are sought in some south coast estuaries.

Recreational fisheries in the marine SEA Area are limited (see Subsection 3.3) and therefore have only a small contribution to cumulative effects. No aquaculture is currently being conducted in the SEA Area so it does not contribute to cumulative effect at present.

5.3 Marine Transportation

The south coast sees extensive shipping activity, nationally through ports in Placentia Bay and Port aux Basques, and internationally through the entrance to the Gulf of St. Lawrence for ships coming from Europe (Figure 5.1). There is local ship traffic such as ferries (see Figure 5.2) and fishing vessels. There has been a chronic problem on the south coast in winter with illegal discharge of oily bilge water by irresponsible ship owners. Seabirds, marine mammals, and sea turtles are the primarily affected VECs.

The SEA Area is in proximity to various shipping lanes so that any activities should be planned in recognition of the location and frequency of traffic. Major shipping routes pass over the middle and southern part of the region (Figure 5.1). The Marine Atlantic ferry from Sydney, Nova Scotia, to Port Aux Basques, Newfoundland and Labrador, transits the western section of the SEA Area, and the Argentia ferry crosses through the area. Commercial cruise lines increasingly frequent ports such as Sydney, Nova Scotia, Charlottetown, Prince Edward Island and Corner Brook and St. John's, Newfoundland and Labrador.



Source: Wiese and Ryan (2003).

Figure 5.1. Shipping Routes in Vicinity of SEA Area.

The eastern Canada and Great Lakes trade route with Europe passes directly through the SEA Area. Oceanex cargo routes from St. John's and/or Halifax to Corner Brook or Montreal cross the SEA Area (Figure 5.2). There is also potential traffic from oil tanker traffic from the Newfoundland Transshipment Terminal and Come By Chance Oil Refinery in Placentia Bay or other locations sailing for east coast refineries (Figure 5.3).

Transport Canada conducted an Environmental Risk Assessment Study of the South Coast of Newfoundland and Labrador (RMRI 2007). This study should be of use in site-specific EAs.

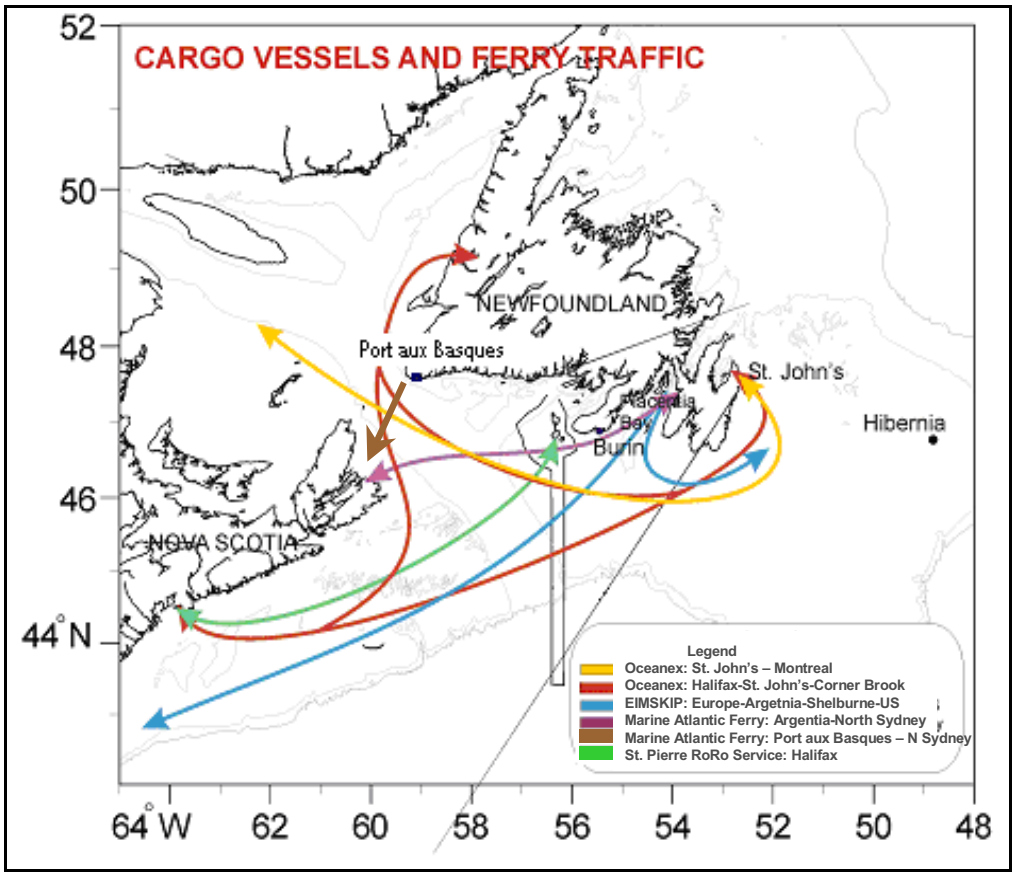


Figure 5.2. **Cargo Vessels and Ferry Traffic.**

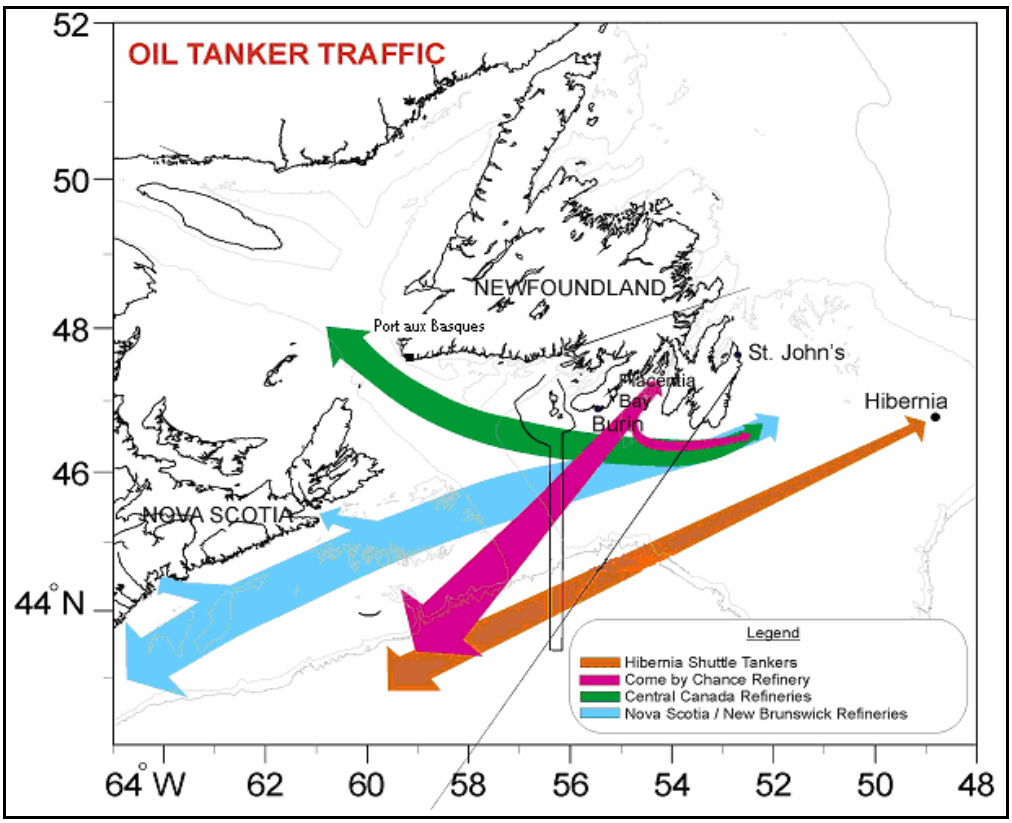


Figure 5.3. **Oil Tanker Traffic.**

5.4 Hunting

Some seasonal hunting of seabirds and seals may occur in limited areas of the SEA Area and thus there is some potential for cumulative effects. Most hunting of seabirds in Newfoundland and Labrador waters occurs inshore. The last harvest survey was run in 2001 and estimated that approximately 300,000 murres were harvested in Newfoundland and Labrador (Wiese et al. 2004). Since then, based on permit purchases, there has been a general decline in hunting participation (CWS, unpublished data). Wiese et al. (2004) modeled the impacts of hunting and oil pollution on the population growth of thick-billed murres and found that hunting decreased the population growth at the same rate as chronic oil pollution, arising primarily from illegal discharges of oily water from ships. Hunting may, therefore, have a cumulative effect with effects of accidental project events in the SEA Area.

5.5 Tourism

The tourism industry provides an important role in rural Newfoundland economies. On the southwest coast, scenic, natural and cultural attractions translate into economic opportunities for the resident population and provide domestic, national and international travelers with world-class outdoor recreation activities. These activities (both commercial and private) include bird watching, whale watching, diving, kayaking, fishing and camping, as well as activities associated with cruise ship visitation and the area's cultural and archaeological attractions.

Bird watching, like whale watching is a popular outdoor activity. The coastal area of the south coast, and particularly offshore islands such as the Ramea archipelago, provide habitat for water-associated birds (shorebirds, waterfowl, and seabirds) such as Atlantic Puffins, Common Eiders, Harlequin Ducks, Canada Geese, Leach's Storm-Petrels, cormorants, Piping Plovers, terns, murres and Kittiwakes (BDDB 2003 *in* JW 2007). Bird watching is a popular activity at Sandbanks Provincial Park, which hosts a nesting colony of Piping Plover (JW 2007). Bird watching is often done in conjunction with other outdoor activities, such as whale watching, hiking and kayaking.

Sea kayaking is a popular activity on Newfoundland's south coast. At least two operators offer sea kayaking tours in the region, one based in Ramea and the other in Burgeo (NLDTCR n.d. *in* JW 2007). The coast is popular for its scenic appeal, including its geomorphological features and its flora and fauna. There are also many sheltered coves and harbours, providing easy access to the land and suitable as camping sites on overnight trips. Aside from official operations, many kayakers enjoy the waters of the south coast independently, and are therefore never recorded in any tourism statistics. This is true of many of these outdoor recreation activities, especially with respect to the outdoor recreation participation of the resident population of the immediate area and of the Province as a whole.

The cruise ship industry in Newfoundland grew from 17,700 passenger visits in 2004, with estimated expenditures of $1.3 million, to 25,600 passenger visits in 2005, with estimated expenditures of $1.9 million. In 2005, Ramea was visited three times and Grand Bruit once. La Poile and François were not visited in 2005 but in 2004 were visited once and three times, respectively (NLDTCR 2006a *in* JW 2007). As of 2 November 2009, the Cruise Complete website http://www.cruisecompete.com/vacations/visits/newfoundland/3 lists 12 cruises by major cruise lines to Newfoundland scheduled for 2010. None of these include ports on the south coast.

5.6 Military Activities

The Department of National Defence (DND) may conduct military exercises in Newfoundland and Labrador waters from time to time. These would be mostly in the form of vessel traffic. Military exercise areas are outlined in the Transport Canada/Coast Guard *Notice to Mariners Annual Edition*. This document can be found on the website www.notmar.gc.ca. If contacted regarding an upcoming oil and gas project, DND will provide information on whether there are any activities scheduled that may conflict with the project but will not initiate coordination with other users. As standard practice, DND issues navigational notices when there is a requirement

to clear an area for military activities. In most cases, any cumulative effects would be in the form of ship activities and potentially the use of sonar. Past military use of the area includes munition dumps (see Subsection 2.6).

5.7 Subsea Cables

There are a number of subsea cables in the SEA Area including a recently installed fibre optic one along the south coast. Additional ones may be installed in the future. The installation of subsea cables generally creates relatively little environmental effect other than the initial disturbance and thus any cumulative effects from bottom disturbance would likely be relatively minor. Operators will be advised to check locations of such cables prior to any seabed activities in order to avoid any mutual damage. Locations are normally marked on navigation charts.