Figure 5.73 shows the number of ships of different classes crossing pipeline KPs per year. The categories are explained in Table 5.27.

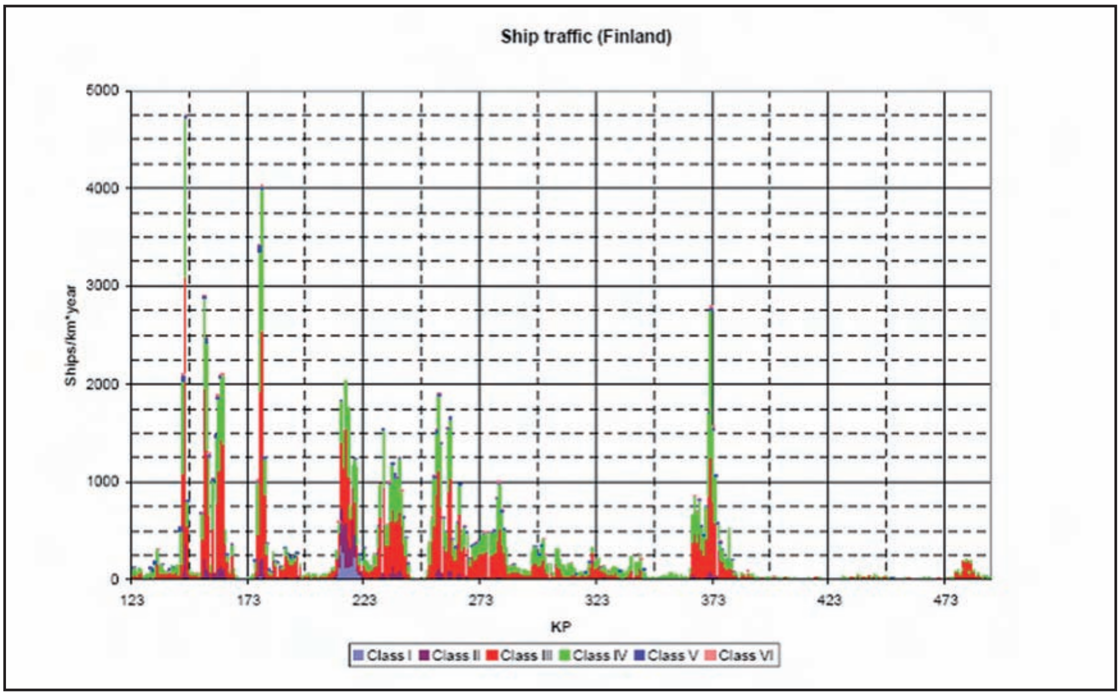

Figure 5.73 Ship crossings by ship class contributions (route C14) /142/ (For ship categories, see Table 5.27).

Table 5.27. Relevant characteristics of the ship classes used in Figure 5.73 /142/.

Ship class	GRT Ship class	Avg. Length [m]	Avg. Width [m]	Draft [m]	Avg. Speed [knots]
1	100÷500	60.7	9.7	3.39	10.2
2	500÷1,600	81.25	12.9	4.66	11.8
3	1,600÷10,000	115.43	17.3	6.8	14.3
4	10,000÷60,000	193.9	27.9	10.75	16.6
5	60,000÷100,000	279.35	43.9	17.17	16.6
6	>100,000	342.97	54.9	21.26	15

<u>Primary routes in the Finnish project area</u>

The primary routes in the Finnish project area are A, J and H (for routing, see Figure 5.66). These routes are used mainly by commercial traffic during the entire year. Routes follow open water area and connect to the fairways when approaching the coastal areas. The primary routes A, J and H are described separately below.

Route A is the primary sailing route for international traffic through the Baltic Sea. The route first runs north of Bornholm. Then passes close to the tip of both, Öland and Gotland islands, and continues east of Gotland and through the Gulf of Finland to Vyborg and St Petersburg (see Figure 5.74).

The characteristics of the ships on Route A are described at four locations along the route (for locations see Figure 5.74) where the ship traffic is continuously monitored /141/.

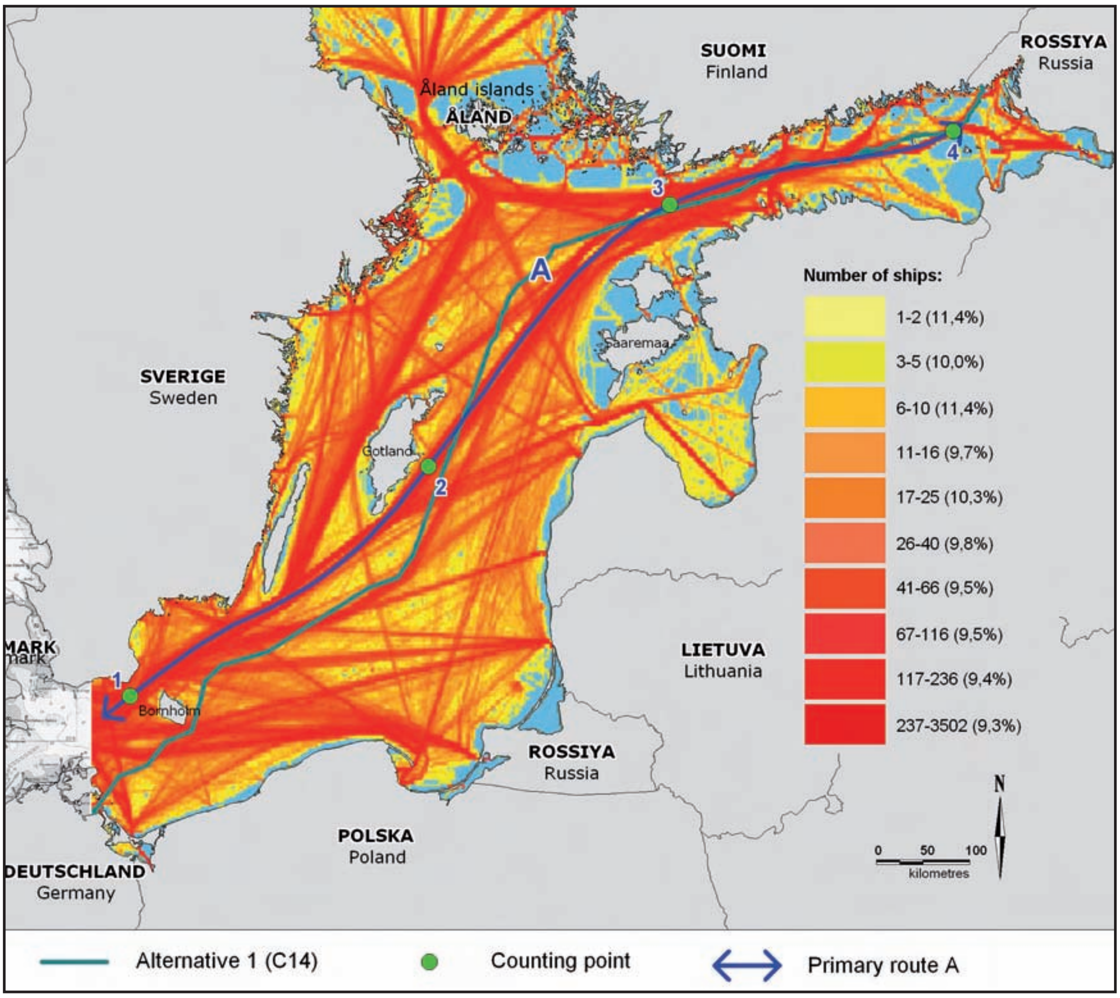

Figure 5.74. Locations along Route A (points 1, 2, 3 and 4) /141/.

The volume and composition of ship traffic along Route A varies. Locations 3 and 4 pertain to the Finnish project area. According to these data, ship movement varies considerably along Route A from around 53,000 ships annually north of Bornholm to around 17,000 ships annually in the eastern Gulf of Finland (see Table 5.28). Approximately 60% of the maritime traffic along Route A consists of cargo ships. Tankers are the second largest group, comprising about 15% of the total maritime traffic (see Table 5.29).

Table 5.28. Annual number of ship movements on Route A monitored in both directions at each location /141/. The locations are shown in Figure 5.74.

Direction	Annual ship movements			
	Location 1	Location 2	Location 3	Location 4
North/east	25,890	8,920	13,690	8,470
South/west	26,740	9,180	12,640	8,450
Total	**52,630**	**18,100**	**26,330**	**16,920**

Table 5.29. Ship distribution at four locations along Route A /141/. The locations are shown in Figure 5.74.

Ship type	Distribution			
	Location 1	Location 2	Location 3	Location 4
Cargo	59.5%	67.5%	54.4%	62.7%
Tanker	14.9%	11.4%	20.3%	15.4%
Passenger	4.7%	5.6%	8.3%	4.5%
Other	1.5%	1.7%	1.9%	4.0%
Unknown	19.4%	13.7%	15.1%	13.3%

Route J is the route for maritime traffic crossing the Gulf of Finland between Helsinki and Tallinn. It passes through the EEZs of Finland and Estonia. According to data collected along the route, annual ship movements both in north/east and south/west directions are almost equal, with a total volume of 13,350 ships a year (see Table 5.30). Passenger ships comprise 81% of the total maritime traffic between Helsinki and Tallinn (see Table 5.31). This traffic also includes high-speed crafts (HSC), which account for approximately half of the passenger-ship movements. HSC routes vary slightly because of wind and wave direction.

Route J is the only location where high-speed crafts cross the pipeline route regularly. Route J crosses the pipeline approximately at KP 205 to KP 225 (see Figures 5.66 and 5.75).

Table 5.30. Annual number of ship movements on Route J /141/.

Direction	Annual ship movements
North/east	6,820
South/west	6,530
Total	**13,350**

Table 5.31. Ship distribution on Route J /141/.

Ship type	Distribution
Cargo	11.9%
Tanker	1.1%
Passenger	81.0%
Other	0.8%
Unknown	5.3%

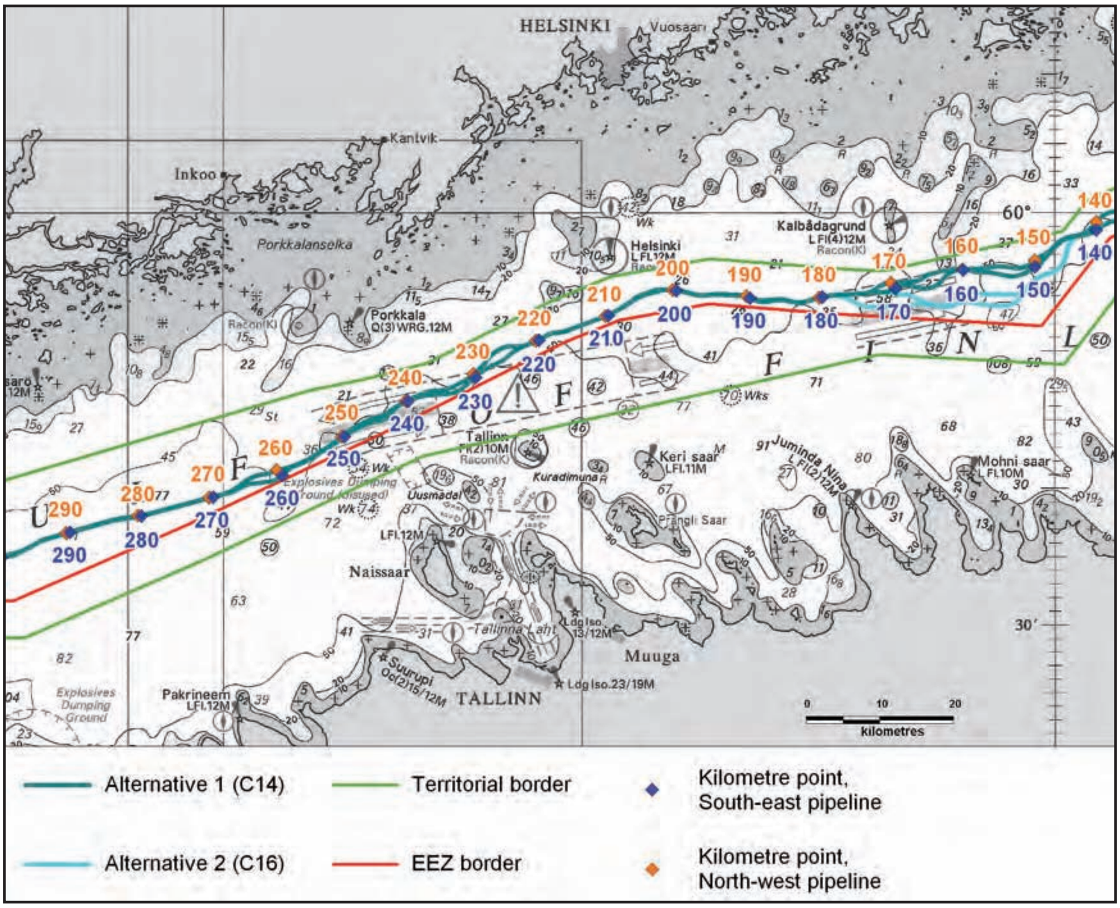

Figure 5.75. Positions of pipeline route and KP points between Helsinki and Tallinn. Route J crosses the pipeline route at approximately KP 205 to KP 225.

Some of the high-speed crafts that use Route J are not ice-proof and therefore can operate only during the ice-free season. On average, the ice season lasts from January until April. The intensity and effect of HSC traffic on Route J can be observed in the following two figures, which show the number of crossings of the planned pipeline route during May and June 2007 (see Figure 5.76) and during January and February 2007 (see Figure 5.77). The figures indicate that between KP 210 and KP 220 the intensity of HSC traffic in wintertime is decreased by half.

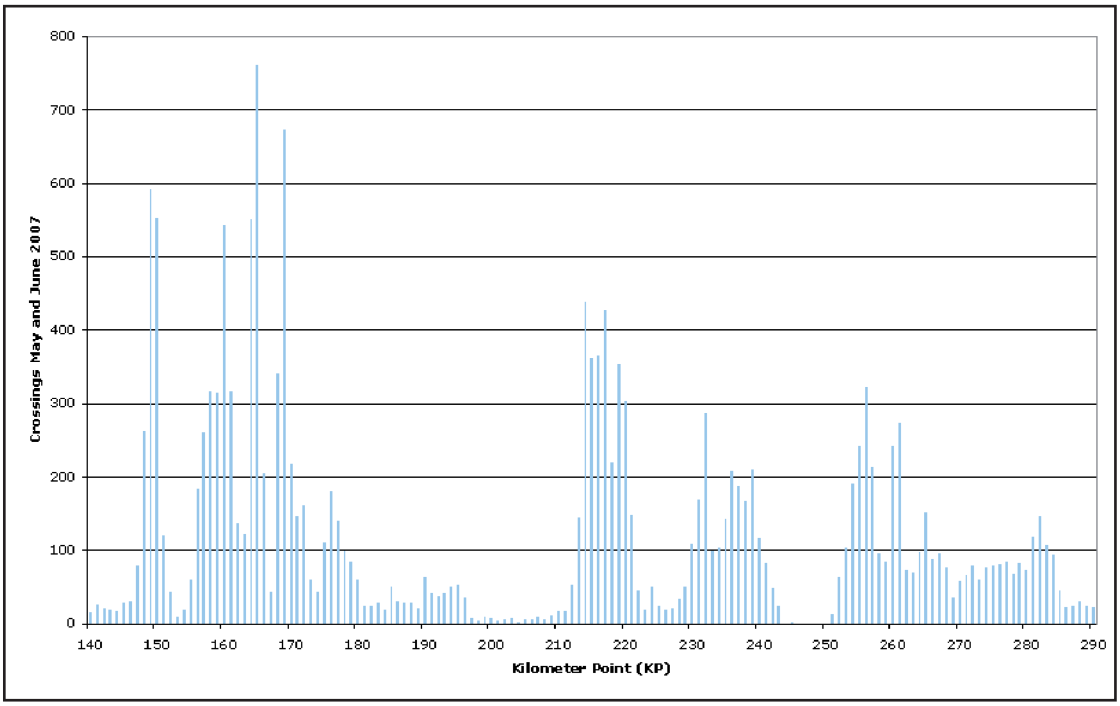

Figure 5.76. Ship traffic intensity (crossings of pipeline route C14) according to kilometre points (KP) during May and June 2007 /141/.

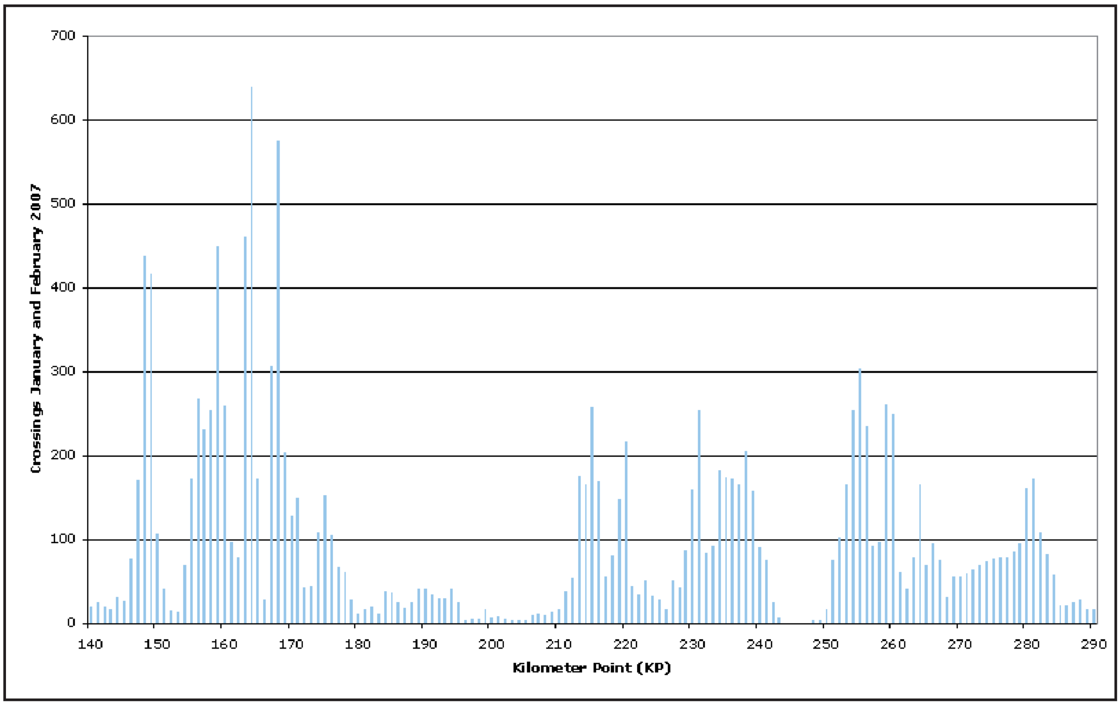

Figure 5.77. Ship traffic intensity (crossings of pipeline route C14) according to kilometre points (KP) during January and February 2007 /141/.

Route H is the connection between the Gulf of Bothnia and the Gulf of Riga (see Figure 5.66). The average width of the shipping route is approximately 15 km, and it passes through the EEZs of Sweden, Finland, Estonia and Latvia. According to AIS data Route H has the lowest number of ship movements of all 14 routes in the project area (see Figure 5.67). Annual ship movements in north/east and south/west directions clearly differ (see Table 5.32). Maritime traffic on Route H consists mainly of cargo traffic, as indicated in Table 5.33.

Table 5.32. Annual number of ship movements on Route H /141/.

Direction	Annual ship movements
North/east	500
South/west	310
Total	810

Table 5.33. Ship distribution on Route H /141/.

Ship type	Distribution
Cargo	84.8%
Tanker	5.2%
Passenger	0.4%
Other	2.4%
Unknown	7.2%

Intensity of different types of maritime traffic in the Finnish project area

General cargo and bulk traffic

On the Finnish coast of the Gulf of Finland there are 16 harbours for cargo and bulk traffic. By the end of 2008, the new Vuosaari Harbour Helsinki will open, which means that most of the cargo traffic at the port of Helsinki will be transferred through the new Vuosaari Harbour. In 2006, the most active Finnish port was the port of Helsinki (see Table 5.34).

Table 5.34. Number of ship visits by type in 2007 in the most active harbours in Finland in the Gulf of Finland (more than 100 visits per year /259, 260/.

Harbour	Passenger ship	ro-ro (roll on, roll off) passenger ship	ro-ro cargo ship	Container ship	Bulk carrier	Other general cargo ship	Tanker	Other ship	Total
Hamina-Fredrikshamn	-	-	567	285	1	373	251	7	**1,293**
Kotka	-	205	570	777	17	972	180	76	**2,797**
Loviisa-Lovisa	-	1	-	-	22	252	1	76	**352**
Kilpilahti-Sköldvik	-	-	-	-	-	7	846	8	**861**
Helsinki-Helsingfors	1,407	7,140	1,522	937	34	186	49	160	**11,435**
Kantvik	-	-	-	-	31	144	13	21	**209**
Inkoo-Ingå	-	-	-	-	19	395	1	133	**544**
Koverhar	-	-	-	-	68	102	-	2	**182**
Hanko-Hangö	-	-	1,366	-	-	24	3	64	**1,457**
Turku	8	1,941	372	37	3	138	69	42	**2,610**
Naantali	1	959	265	-	47	155	166	18	**1,611**
Maarianhamina	377	3,383	-	-	7	55	-	13	**4,191**
Långnäs	1	1,061	-	-	-	-	-	-	**1,062**
Eckerö	-	1,170	-	-	-	-	-	-	**1,170**

International passenger traffic

The largest passenger and tourism ports in Finland are Helsinki, Mariehamn (in Åland) and Turku (see Table 5.35). In the port of Helsinki, the number of arriving passenger ships varied from nearly 8,000 to more than 10,000 (between 2000 and 2007). In 2007, there were more than 4.5 million arriving passengers, comprising more than half the waterborne passenger traffic in Finland /259/.

Table 5.35. Number of arriving passenger ships in the major ports of Finland in the Gulf of Finland regarding Åland area and Archipelago Sea in 2003-2007 /259, 260/.

Port	2003	2004	2005	2006	2007
Hamina	1	1		1	
Kotka		3	18	203	205
Helsinki	8,126	10,069	9,843	8,339	8,547
Hanko	298	307	338	384	1,366
Turku	2,069	2,061	2,096	2,101	1,949
Korppoo	1	2	1		
Naantali	339	692	669	687	960
Maarianhamina (Mariehamn)	3,200	3,915	4,359	4,014	4,116
Långnäs	1,363	1,364	1,349	1,350	1,062
Eckerö	1,233	1,239	1,233	1,226	1,170

There are regular, year-round passenger car-ferry connections from Finland to Sweden, Estonia and Germany. Most of the waterborne passenger traffic in Finland consists of traffic between Finland and Sweden and Finland and Estonia. In addition, there are quicker connections to Estonia with high-speed crafts in summer. For example, in the summer of 2008 there were nearly 40 departures per week from Helsinki to Tallinn and the same number of returns /259, 261/.

Domestic passenger traffic

In addition to international traffic, there is a significant volume of domestic passenger traffic in the Gulf of Finland. In 2007 approximately 2.6 million domestic passengers travelled in the Gulf of Finland, of which 2.5 million passengers travelled in the Helsinki region. More than 80% of the traffic in the Helsinki region was regular line service /261/.

There has been little increase in the volume of domestic maritime traffic in the coastal and archipelago areas since the early 1990s. In 2007, approximately 214,000 passengers used the domestic routes in the Archipelago Sea; and in the Åland area, approximately 577,000 passengers used domestic routes. /261/.

International cruises

Helsinki is the main international cruise destination in Finland. About 250 international cruise ships visit the port of Helsinki annually. There are also a few international cruise ship visits yearly in Turku and Mariehamn. The number of international cruise ships arriving in Finland has increased in recent years. At the same time, the number of passengers increased by approximately 85% (from 140,000 to 270,000 passengers), mainly due to increased cruise-ship capacity. International cruise traffic is clearly scheduled in the summer months /259, 260, 262/.

Fairways

Most of the fairways in the coastal areas of Finland are governed by the Finnish Maritime Administration, which has 3,251 km of merchant fairways under its jurisdiction. These deep fairways are used by international passenger traffic as well. There are also other fairways used by less draught, small craft tracks and boating routes for pleasure boats. None of the fairways mentioned above cross the pipeline route. The coastal fairways in southern Finland are shown in Figure 5.78. /263/.

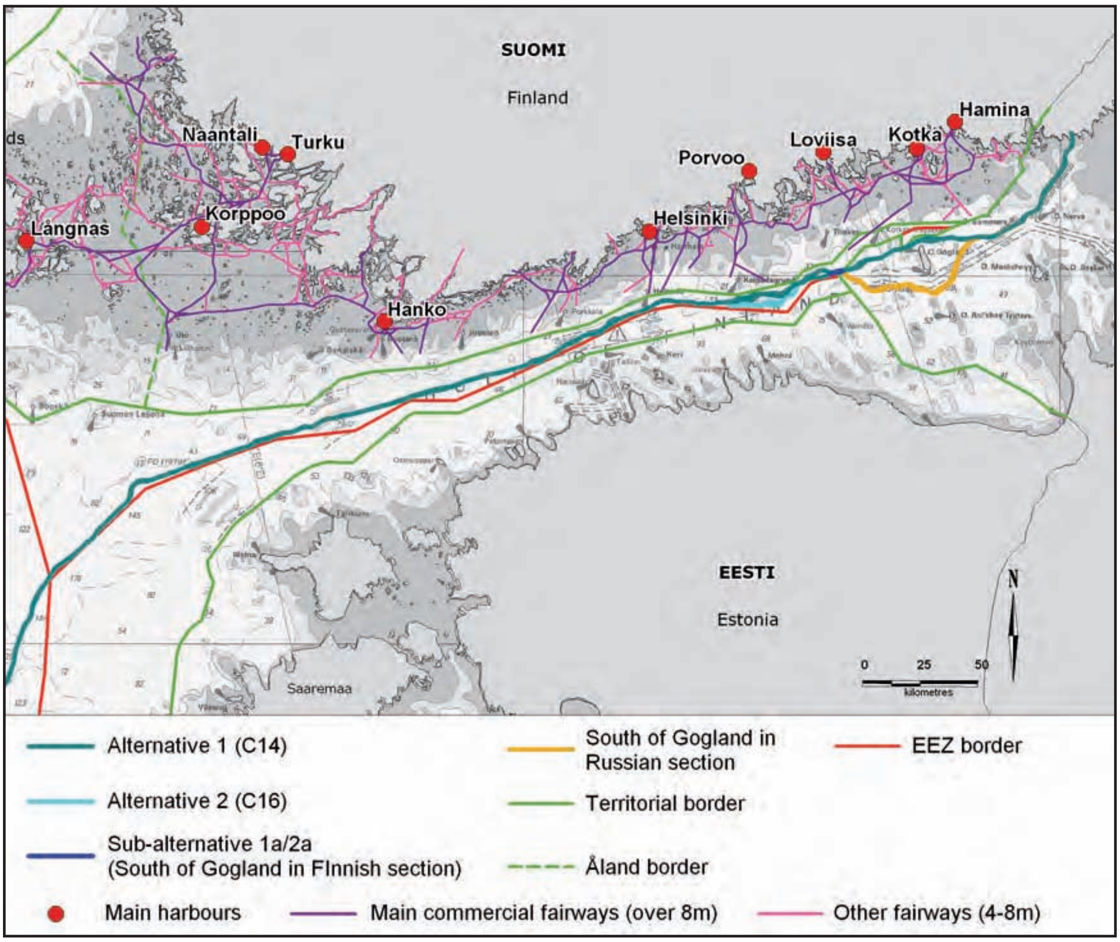

Figure 5.78. Fairways on the coastline of southern Finland /263/.

5.6.2 Fishery

5.6.2.1 Overview

Fishery is of some importance in Finnish waters. At the end of 2007, the register of professional fishermen in Finland included 2,059 fishermen who operated at sea /196/. One-third of them earned at least 30% of their income from fishing. The number of professional fishermen was highest in south-western and western Finland /196/. Professional fishery in the Gulf of Finland includes both coastal and offshore fishing. Offshore fishing is comprised of trawling, long-line fishing and drift-netting. In the coastal areas, mostly nets and trap nets are used.

Recreational fishery is concentrated mainly in the coastal and archipelago areas. In the offshore area, salmon trolling is also practised by recreational anglers.

There have been major changes in the Finnish offshore fisheries in the Gulf of Finland over the last 20 years. The EU has banned drift-net fishing in the Baltic Sea since the beginning of 2008; maritime traffic has expanded massively; and the seal population has increased enough to hamper salmon fishing. Trawl fishing has also diminished due to unfavourable market situation of herring and sprat. At present, salmon fishery has nearly ceased in the offshore areas of the Gulf of Finland /264/.

In most parts of the Baltic Sea fishery is subject to regulations that aim to secure sustainable utilisation of fish and other living aquatic species. The regulations are implemented through the common fishery policy of the European Community and published in council regulations, e.g., Council Regulation no. 2371/2002, relating to sustainable utilisation of fish resources within the European Community.

The Finnish commercial fishing fleet operating in the project area in the Finnish EEZ consists of eight trawlers /265/. Six smaller trawlers are allowed to fish only in the northern Baltic (above 59°N) due to sea-safety regulations. Two larger trawlers operate mostly in the southern Baltic Sea and land their catch in Swedish and Danish ports /265/.

There are no restrictions on the size of commercial fishing vessels in the Baltic Sea; however, according to the data collected from the Baltic Sea coastal countries /191/, the largest vessels at present are about 300 gross register tonnes (GRT) with a maximum bollard pull of approximately 25 tonnes. The trawl board size for fishing vessels in the Baltic Sea is generally in the range of 300-500 kg, and the maximum size at present is 1.5 tonnes.

Trawls are the principal gear type used in commercial fishery in the open waters of the Baltic Sea. Mid-water trawls are used to capture herring and sprat. Mid-water trawls are also used by Finnish fishermen in the offshore areas of the Gulf of Finland and the northern Baltic Proper /265/. Mid-water trawls are used in the middle water column but can be used at the near bottom as well when fish schools are located in deep water. In soft-bottom areas where the seabed topography is smooth, the trawl is nearly always towed close to or at the seabed. When it is set out or pulled, the trawl falls to the seabed or scrapes it /266/. According to data from the Finnish Fishermen's Association, both middle and bottom trawling (or close to the bottom/approximately 4 m) are somewhat regularly carried out in the central and western Gulf of Finland /266/.

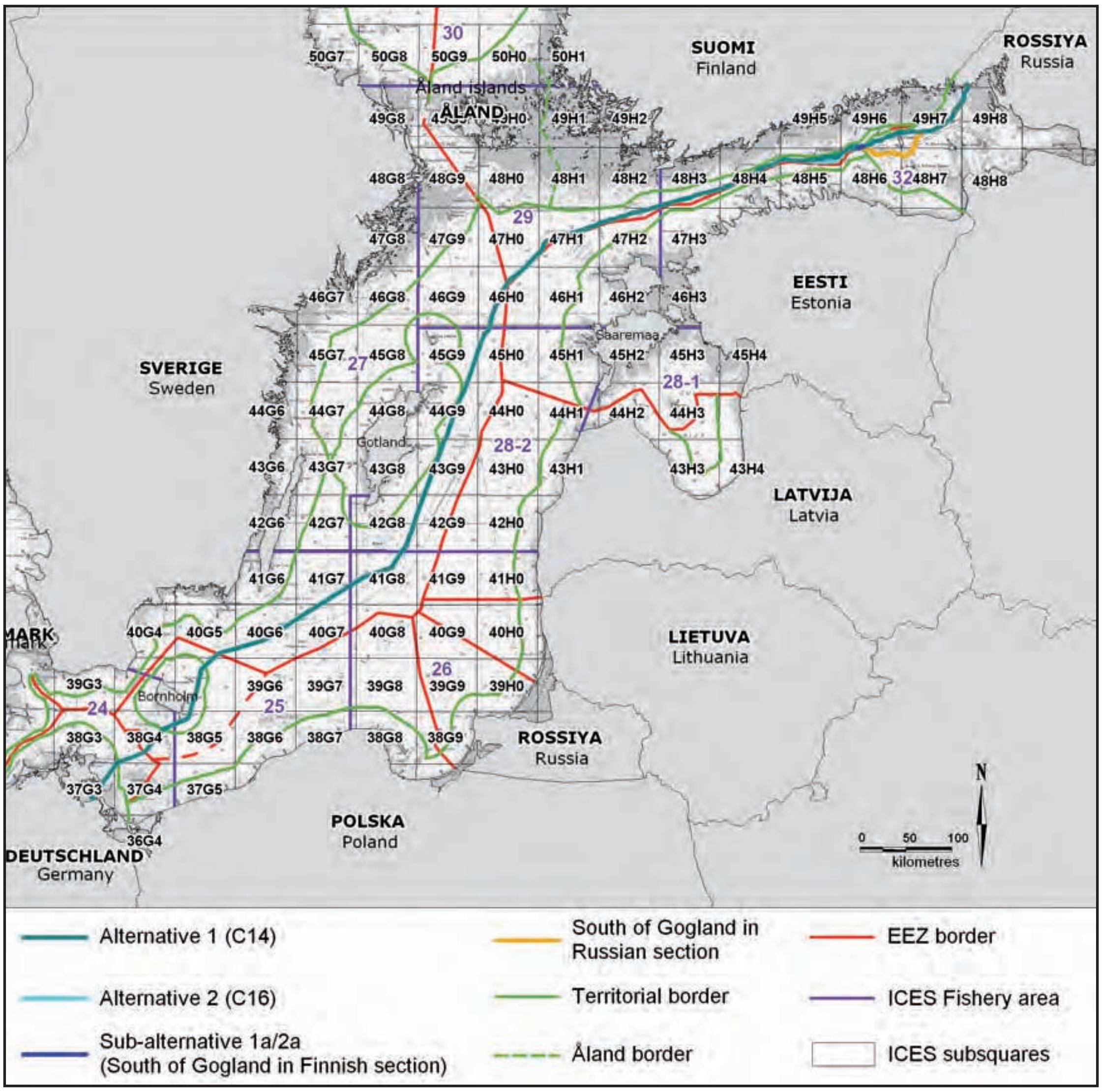

Figure 5.79. The Baltic Sea ICES fishery sub-divisions (bordered in purple) and sub-squares.

5.6.2.2 Fishery in the Finnish project area

Fishery statistics for the Baltic Sea have been collected from two sources: the International Council for the Exploration of the Sea (ICES) and data collection schemes. Data from the International Council for the Exploration of the Sea (ICES) sub-divisions 24 - 32 have been obtained from ICES (see Figure 5.79). The Baltic Sea is divided into ICES sub-divisions, which are further divided into sub-squares. The system outlines large squares (24 - 32), which are further divided in sub-squares. The area of the sub-squares covers 0.5° N-S and approximately the same distance E-W, representing about 55x55km= 3,025 km². Fishery data from the sub-squares have been collected via 'data collection schemes', which were sent to the national offices for fishery management in the Baltic Sea coastal countries. Data collection was also carried out through interviews with the Finnish Fishermen's Association and fisheries authorities from the Ministry of Forestry and Agriculture.

In Finnish waters the planned pipeline route runs through a number of ICES sub-squares, as indicated in Figure 5.80. According to the data of fishing days in the ICES sub-squares, the most important fishing areas in the Finnish EEZ are sub-squares 48H2 and 48H3, south and south-west of the town of Hanko (see Table 5.36) /267/. In recent years, more fishing days have been recorded in these areas than in other sub-squares in the Finnish EEZ.

The most used trawling areas, drawn by Finnish trawlers, cross the pipeline route at a total distance of 220 km from the pipeline in Finland (see Figure 5.80).

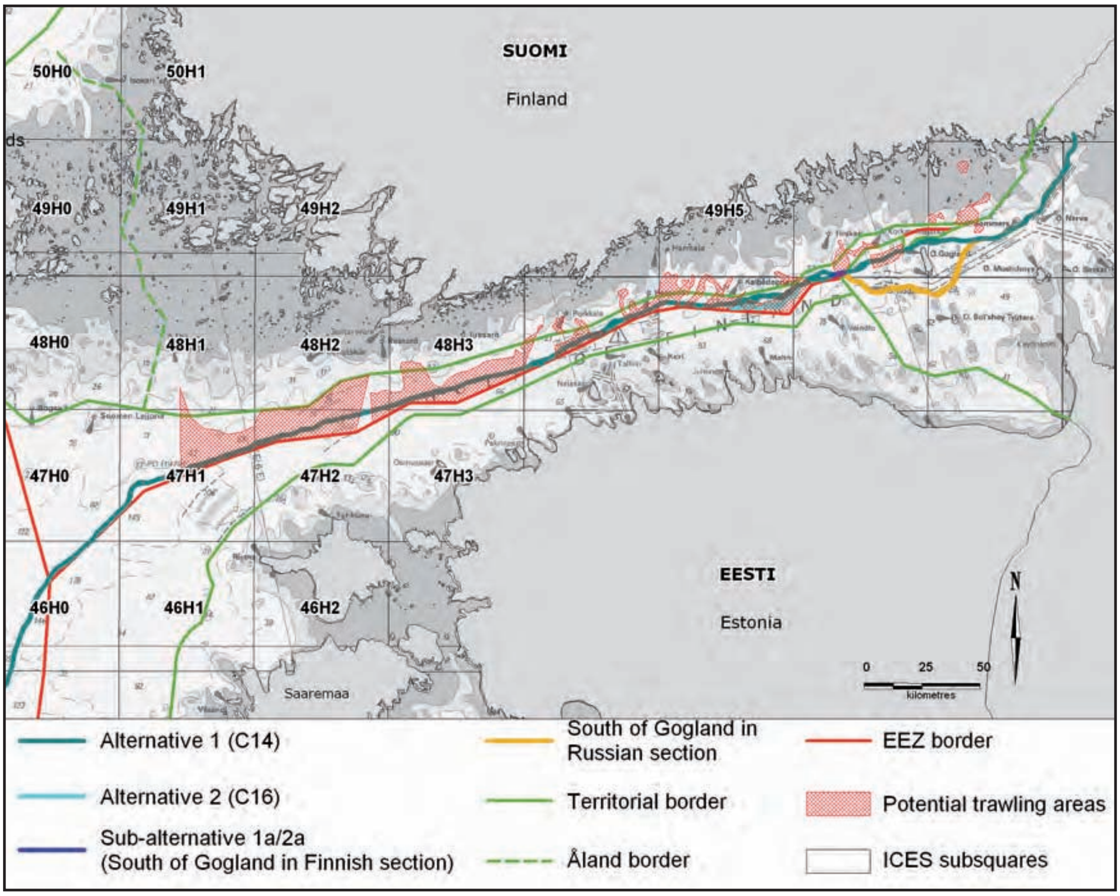

Figure 5.80. The most-used trawling areas within the Finnish EEZ. The information for the map was obtained from the Finnish Fishermen's Association (SAKL).

The potential trawling areas are shown in Atlas Map FC-2b-F and the reported trawling intensity (in weight of catch), divided on the ICES sub-squares, is shown in Atlas Map FC-2a-F

Table 5.36. The sum of fishing days in specific ICES sub-squares by Finnish vessels of 10 m or more in length in the years 2002-2006 /267/.

	2002	2003	2004	2005	2006
47H0	2	7	9	7	7
47H1	9	52	79	46	22
47H2	49	52	77	73	19
47H3	0	0	0	3	0
48H2	474	429	337	272	273
48H3	544	326	149	89	112
48H4	275	44	7	25	38
48H5	38	2	3	11	2
48H6	0	0	0	0	0
48H7	0	0	0	0	0
49H4	39	37	43	23	36
49H5	127	74	63	32	11
49H6	291	103	78	67	14
49H7	16	10	6	12	6
49H8	0	0	0	0	0
50H7	3	2	13	3	0
50H8	0	0	0	0	0

Fishery in the offshore areas of the Gulf of Finland and the northern Baltic Proper is characterised by a low number of target species. This phenomenon is a consequence of the unique brackish characteristics in the northern Baltic and especially in the Gulf of Finland. The fish community is dominated by herring (Clupea harengus) and sprat (Sprattus sprattus). Salmon is also present in this area, but it is not much targeted by fishing. In the beginning of 1980s cod (Gadus morhua) was abundant in the Finnish sea area, but it has since been almost absent. Possible salt water inflows from Danish sounds to the Baltic Sea could make cod stock to extend further north to the Gulf of Finland. That would have impacts on fishery by allowing trawlers to fish more valuable species.

Sprat and herring are commercially the most important species, comprising by weight about 95% of the total commercial catch in the Finnish EEZ fisheries in the Gulf of Finland, the Archipelago Sea and the northern Baltic Proper. In 2004, 2005 and 2006, the most important areas in the Finnish EEZ for fishery were at the entrance to the Gulf of Finland and in the northern Baltic Proper (Figure 5.81, Figure 5.82 and Figure 5.83). The fishing method for these species is trawling, either by single boat or by two boats.

Sprat: The exploitation rates of sprat in the Baltic main basin increased in the mid-1990s. Sprat has remained at the higher level since then /196/, and the species are considered to be harvested within safe biological limits /196/. The catch of sprat was 2,990 tonnes in the Gulf of Finland (3,508 tonnes in the Bothnian Bay) /194/. A decrease in the mean weight of sprat has been observed in all year classes since 1993. However, imprecise estimates of species composition in the mixed fisheries have contributed to the variation in stock estimates in recent years /194, 195/.

Herring: The exploitation rates of herring in the Baltic main basin increased in the mid-1990s. The total catch of herring in ICES sub-divisions 25-29 and 32 has declined to almost half of what it was in the period from 1995-2005 /196/. The decline is linked to a decrease in the mean weight of all year classes; this trend has been observed since 1993 in Baltic herring stocks /196/. Finnish herring fishery is concentrated in the Bothnian Bay: the catch of herring of the Finnish trawlers in the Gulf of Finland was 1,401 tonnes in 2006 compared with the Bothnian Bay, where catches were more than 66,000 tonnes.

Finnish fisheries have EU exception to market Baltic herring that exceeds content of dioxine until the end of 2011. If this exception would not be continued it will have strong effect on Finnish trawl fishing in Finnish EEZ. Traditional herring fishing will face adaptation to new situation. Political situation at the time of decision is hard to foresee.

Climate change projections for the Baltic Sea basin indicate higher temperatures and possibly decreasing salinity. In this scenario, the present clupeid-dominant regime in the Baltic fish community would be stabilised. However, changes in the fishery exploitation level have great potential to alter the food-web structure and thus to modify the outcome of climate-induced changes.

Salmon is a target species for Finnish offshore fisheries mainly in the Bay of Bothnia and in the central and southern Baltic /264/. The project area near the pipeline route in the Finnish EEZ is not part of that area.

The weight of the fish catch in 2004, 2005 and 2006 in the ICES sub-squares is presented in Atlas Maps FC-4-F, FC-6-F, FC-20a-F, FC-20b-F and FC-20c-F. Similar data on the value of fish catch in 2004 and 2005 is presented in Atlas Maps FC-5-F, FC-7-F and FC-19-F.

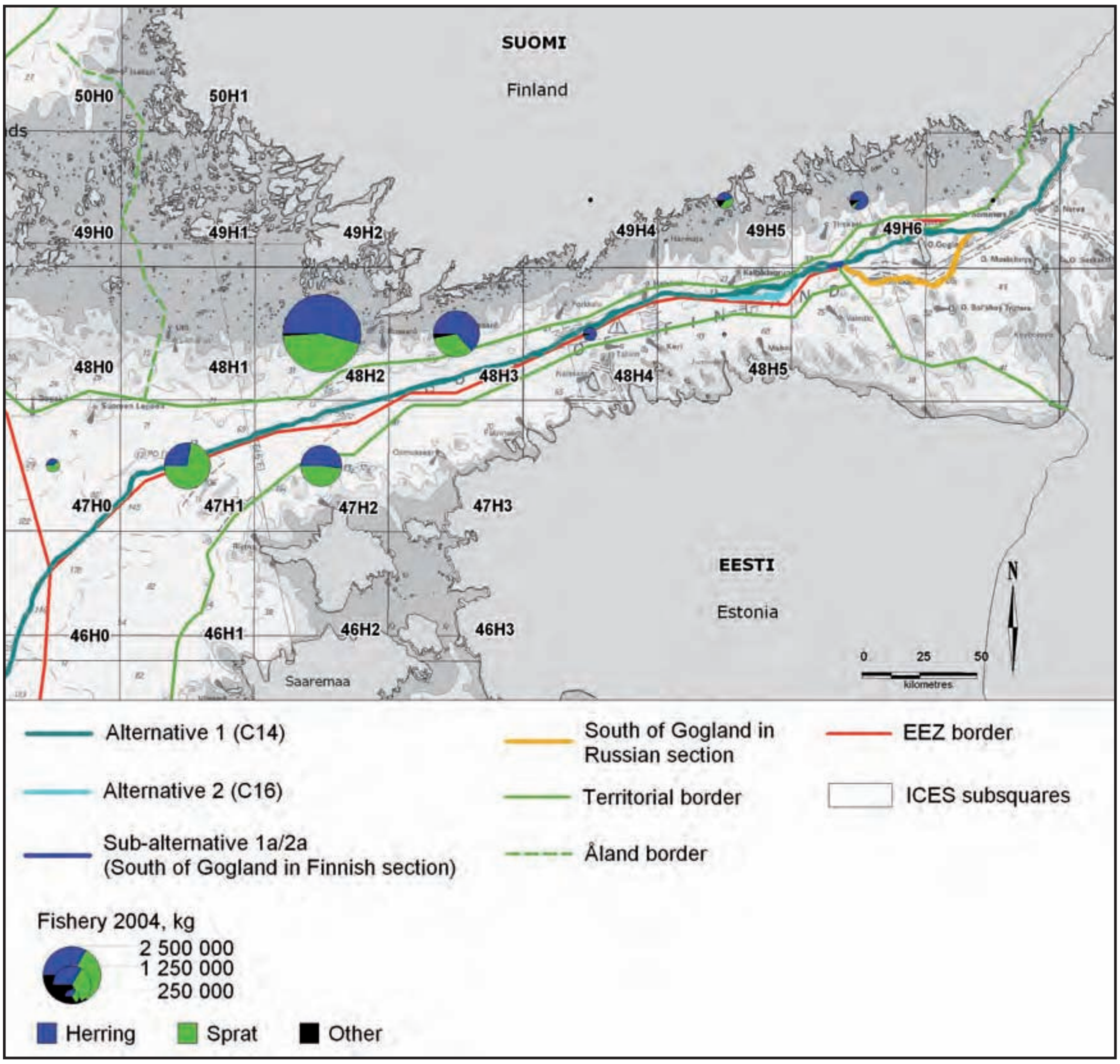

Figure 5.81. Finnish commercial fisheries: catches (in weight) by species in ICES sub-squares in 2004. For details, see Atlas Map FC-20a-F.

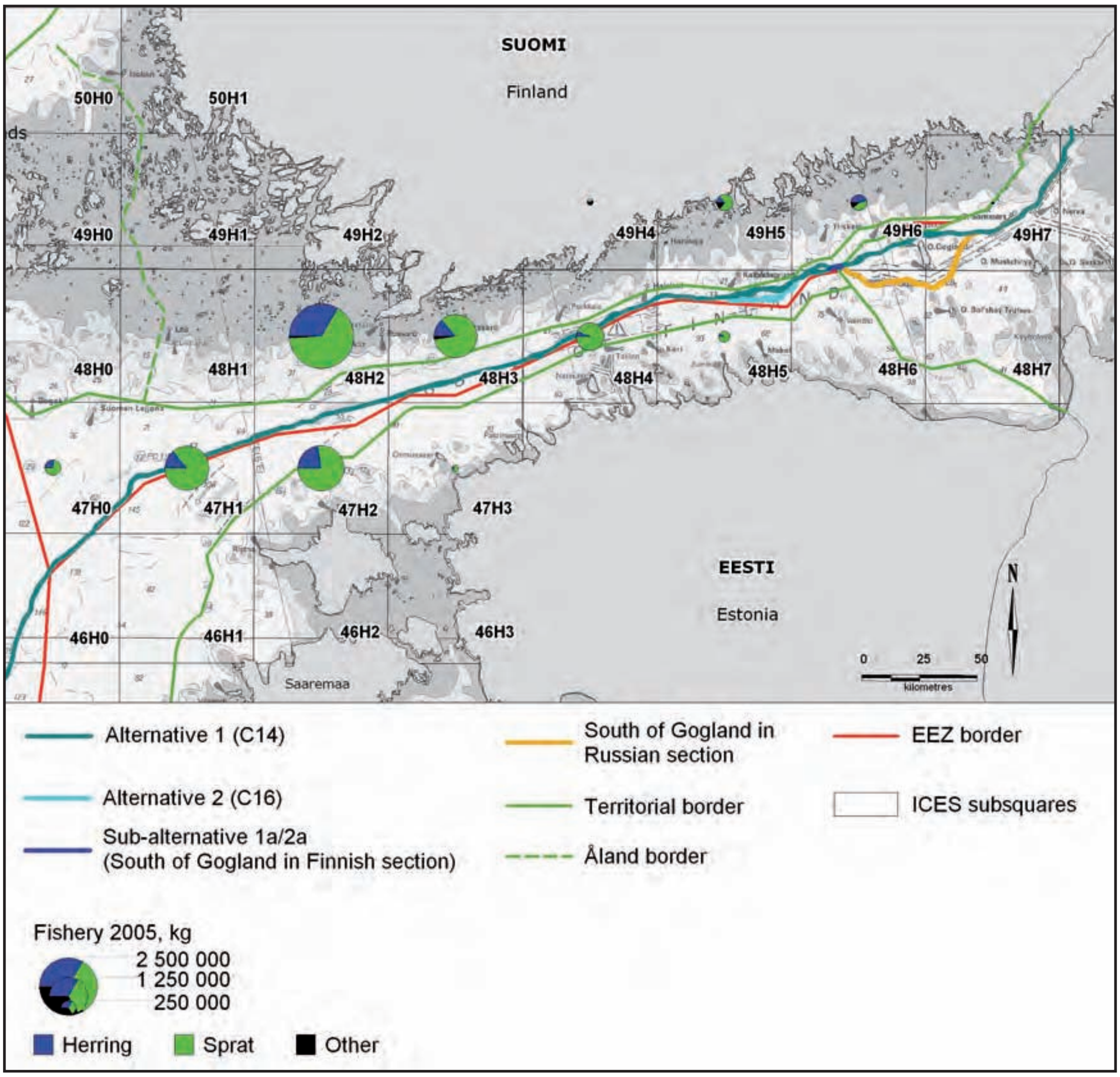

Figure 5.82. Finnish commercial fisheries: catches (in weight) by species in ICES sub-squares in 2005.

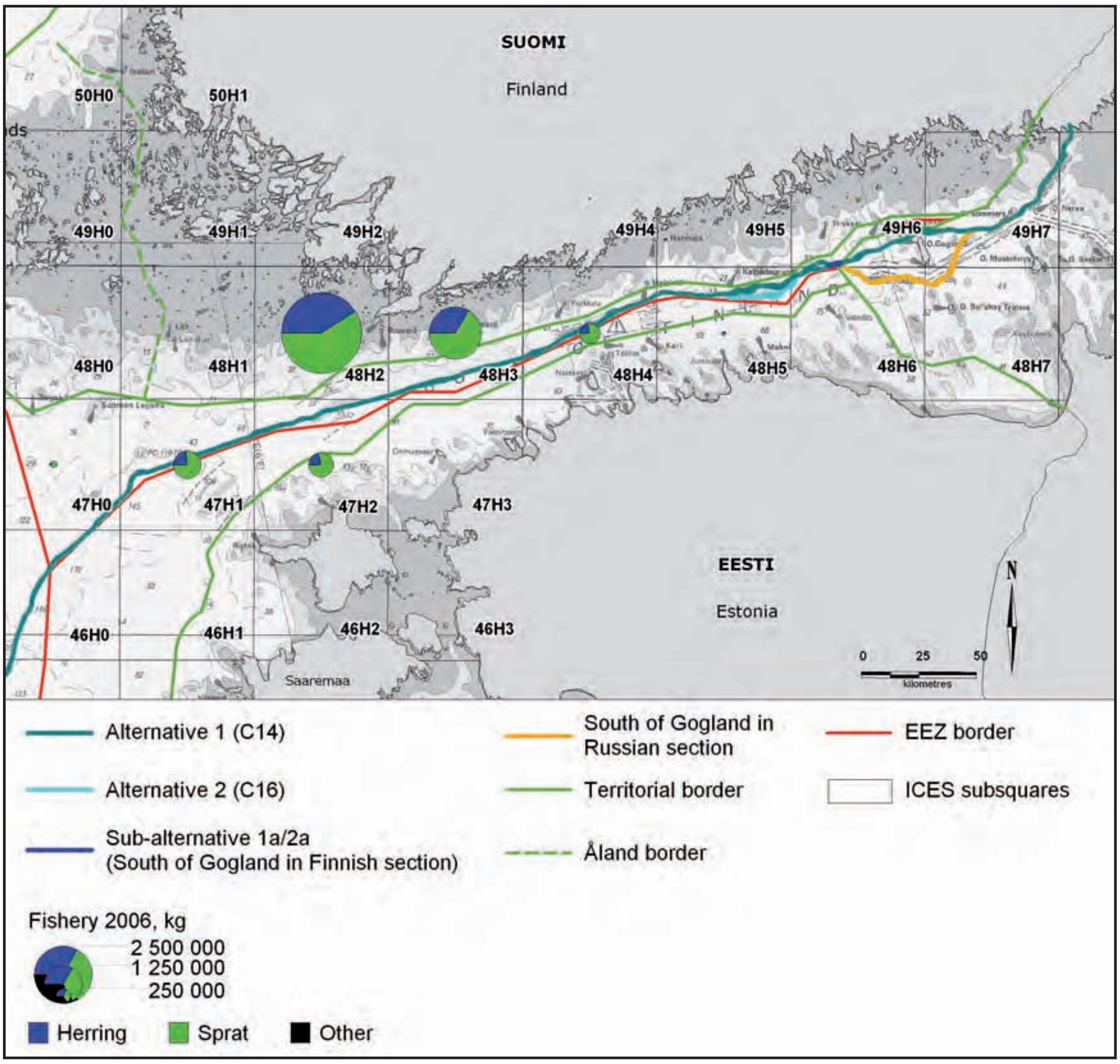

Figure 5.83. Finnish commercial fisheries: catches (in weight) by species in ICES sub-squares in 2006.

5.6.3 Tourism and recreation

5.6.3.1 Overview

Tourism in the Baltic Sea region is an important and continuously developing industry. Leisure activities are diverse. There is a high concentration of summer cottages along the coast and on the islands; there are beautiful landscapes, beaches and several national parks. Leisure boating is also popular, both along the coast and between countries, and recreational fishing is promoted heavily along the coast. The Baltic Sea also contains an efficient network of regular ferry lines, which are important for tourism infrastructure. Tourism is closely linked to nature and the Baltic Sea itself.

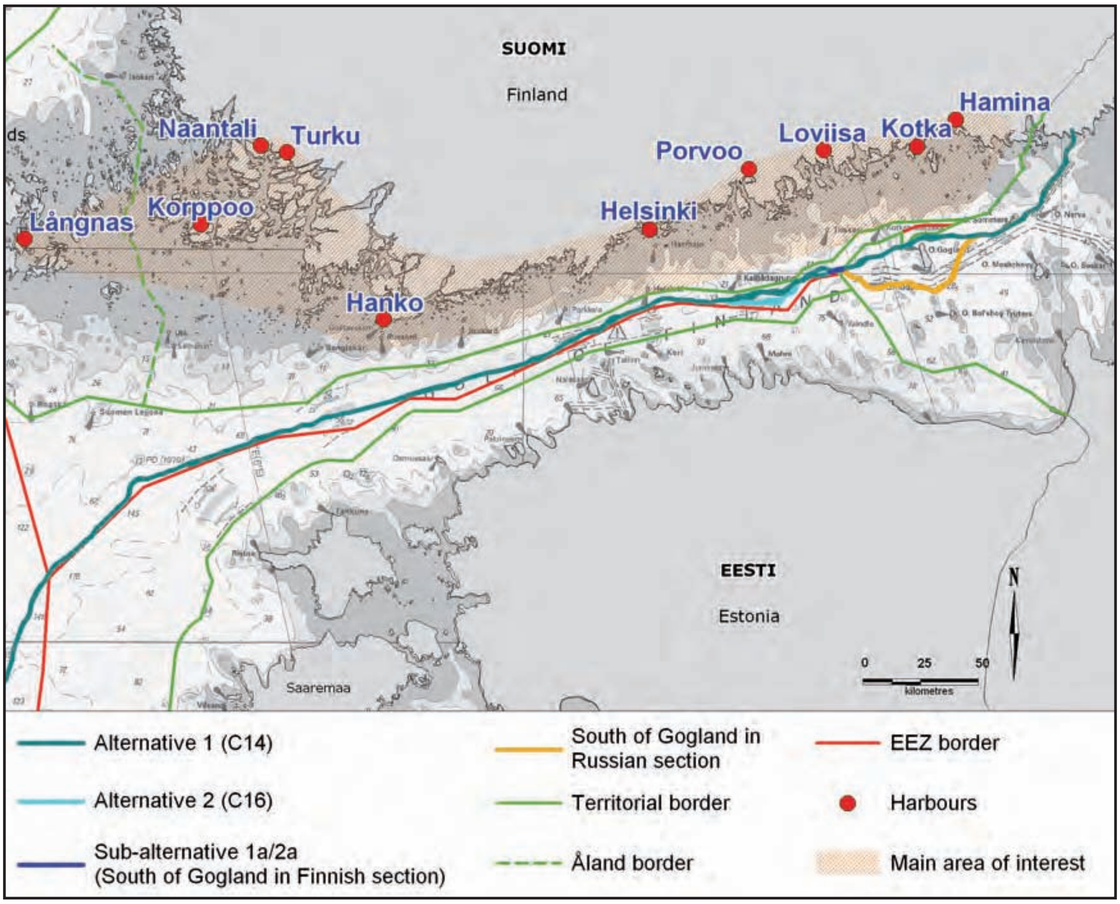

Figure 5.84. Main areas of tourism and recreational activities on the Finnish coast of the Gulf of Finland.

Tourism is an important and growing economic sector in Finland. In recent years the amount of foreign tourists as well as overnight stays has increased steadily (5.7 million foreign visitors in 2007). The total demand of tourism was around 9.6 billion euros in 2005. The value added by tourism was around 3.255 billion euros, that is about 2.4% of Finland's gross domestic product (GDP) /268-270/.

According to the Finnish National Tourism Strategy, the use of coastal areas and the archipelago is not yet at its peak and has great potential for growth. Authorities and entrepreneurs seem to have a strong desire to develop tourism in the coastal areas and the archipelago. Most of the tourists visiting the coastal region are domestic or from neighbouring countries, although the number of international cruise ship visits is increasing. The main attractions and activities are related to nature and the archipelago, such as leisure boating, fishing and bathing (see Figure 5.84). Typically, Finnish coastal tourism is somewhat dispersed /270-273/.

Tourism in the coastal areas is highly seasonal due to weather conditions, with the peak season during the summer holidays. Winter leisure tourism is undeveloped in the coastal areas due to the harsh climate. However, shopping cruises between Finland and Sweden and Finland and Estonia are popular all year round /268-270/.

5.6.3.2 Important tourism activities and sights in the Finnish project area

The tourist attractions in the Finnish archipelago and coastal areas are mainly small-scale. There are, however, some larger events and sights. The main destinations along the southern coast of Finland are the capital city of Helsinki and the cities of Hanko, Porvoo and Kotka–Hamina area. Suomenlinna, a 250-year-old fortress-island just outside Helsinki, is included on UNESCO's World Heritage List. The city of Turku on the south-western coast, with its various islands and tourist routes around the archipelago, is a popular destination. Åland Island is home to smaller nature destinations and a popular leisure-boating area. However, it is situated a bit further from the pipeline route. /274/

A major sailing event in July, the Tall Ships Race Baltic, is sailed in the Baltic Sea approximately every fourth year. In 2007 Kotka was a host city. The tall ships will also visit the Baltic Sea again in 2009 (host cities Gdynia/Poland, St Petersburg/Russia, Turku/Finland and Klaipeda/Lithuania), drawing between 70 and 100 traditional sailing ships and hundreds of thousands of spectators. In 2010 and 2011 the Race is sailed in the Northern and Atlantic Sea (between Belgium, Denmark, Norway and UK in 2010 and between Scotland, Shetland Islands, Sweden and Norway in 2011). In 2012 the race takes place in the Atlantic between France, Portugal and Spain. /275/

Passenger traffic

Tourism-related passenger and cruise traffic are described in Chapter 5.6.1 Ship traffic.

Leisure boating

Boating and boating-related tourism is an important economic sector for some coastal municipalities. Boating is mainly domestic; boating from other countries is quite rare, apart from that between Sweden and Finland in the Archipelago Sea, where boating has long traditions. In recent years boating between Finland and other Baltic countries (e.g., Estonia) has increased. Although there are no official statistics concerning boating tourism along the Finnish coast and in the Archipelago Sea, it is expected to remain at its current level or slightly increase in coming years. /276/.

There are more than 320 guest piers and guest harbours for leisure boating in the Gulf of Finland, the Archipelago Sea and Åland. Standards vary from guest harbours accommodating hundreds of boats to small piers. Most of the guest harbours are only modest places for anchoring. On the coast and especially in the Archipelago Sea there are some guest harbours that welcome several thousands of visiting boats each year (see Table 5.37). According to a one-time study carried out by the Finnish Maritime Administration in 2005 the number of visiting boats has been quite constant or has increased slightly in recent years /276, 277/.

Table 5.37. Number of visitors in larger guest harbours in 2003 – example from one-time study /276/.

Number of overnight stays in some larger guest harbours in 2003	
Guest harbour	**Boats**
Ekenäs (Tammisaari)	2,836
Hanko	8,300
Loviisa	1,002
Nauvo	5,200
Parainen (Kalkholmen)	1,974
Uusikaupunki	2,725
Åland (Ahvenanmaa)	32,000

Leisure fishing

Fishing is a growing tourism sector in Finland and a target sector of the Finnish National Tourism Strategy for 2007–2010. The number of fishing tourists is expected to increase /272/. Leisure fishing is a year-round pursuit in the Gulf of Finland, as ice-fishing is popular in winter. The principle leisure-fishing seasons are spring and autumn, and many people enjoy fishing during summer holidays. Leisure fishing and fishing tourism are popular throughout the archipelago area, and salmon fishing is popular in the open-sea areas. Spring and autumn are high seasons for fishing in the inner archipelago. The number of foreign fishermen, most of which come from Sweden, has increased in recent years /278-281/.

According to a study by Finland's Game and Fisheries Research Institute, Finland was visited by more than 1,800,000 recreational fishermen in 2006. Most of the leisure fishing in Finland takes place in inland waters. Slightly less than one-fifth of the recreational fishermen fished mainly in the Gulf of Finland and in the Archipelago Sea and Åland area /282/. Leisure fishing techniques do not include trawling or other large-scale fishing methods.

National parks

Three national parks are located within the area under consideration along the coast of the Gulf of Finland: the Eastern Gulf of Finland National Park, the Ekenäs Archipelago National Park and the Southwestern Archipelago National Park. They are indicated in Atlas Map PA-6-F and presented in more detail in Chapter 5.5 Protected areas. Table 5.38 shows the estimated number of visitors to the three national parks in 2007. The number of visitors is based on visitor-counting devices located in the parks as well as on separate visitor studies /283/.

Table 5.38. Estimated number of visitors in the national parks on Finland's southern coast /283/.

Park	Number of visitors in 2007
The Eastern Gulf of Finland National Park	17,000
The Ekenäs Archipelago National Park	47,000
The Southwestern Archipelago National Park	60,000

Summer cottages

Approximately two million people enjoy Finland's nearly half-million (475,000) summer cottages. Around 10 % of these are located in coastal areas, and another 1%– 2% around Åland Island. A map showing the density of leisure homes in the coastal areas in the Gulf of Finland is presented in Figure 5.85. Blue represents areas where there are between one and five cottages per 25 km² area; areas where there are 101–730 summer cottages per 25 km² are indicated in red. There are few individual summer cottages at a distance of 5–10 km from the pipelines. There are several cottages at distances more than 10 km from the pipelines. The nearest concentration of summer cottages is located outside Porkkala west of Helsinki, approximately 5–10 km from the pipeline route. /284-286/.

Seasonal leisure homes are becoming more and more popular in Finland, and some of them are being turned into primary residences. Finland's government has established a policy stating that the obstacles to allowing leisure homes to be transformed to year-round homes should be removed. As a result, it is possible that summer cottages may evolve into year-round homes in the archipelago as well. /285, 287/.

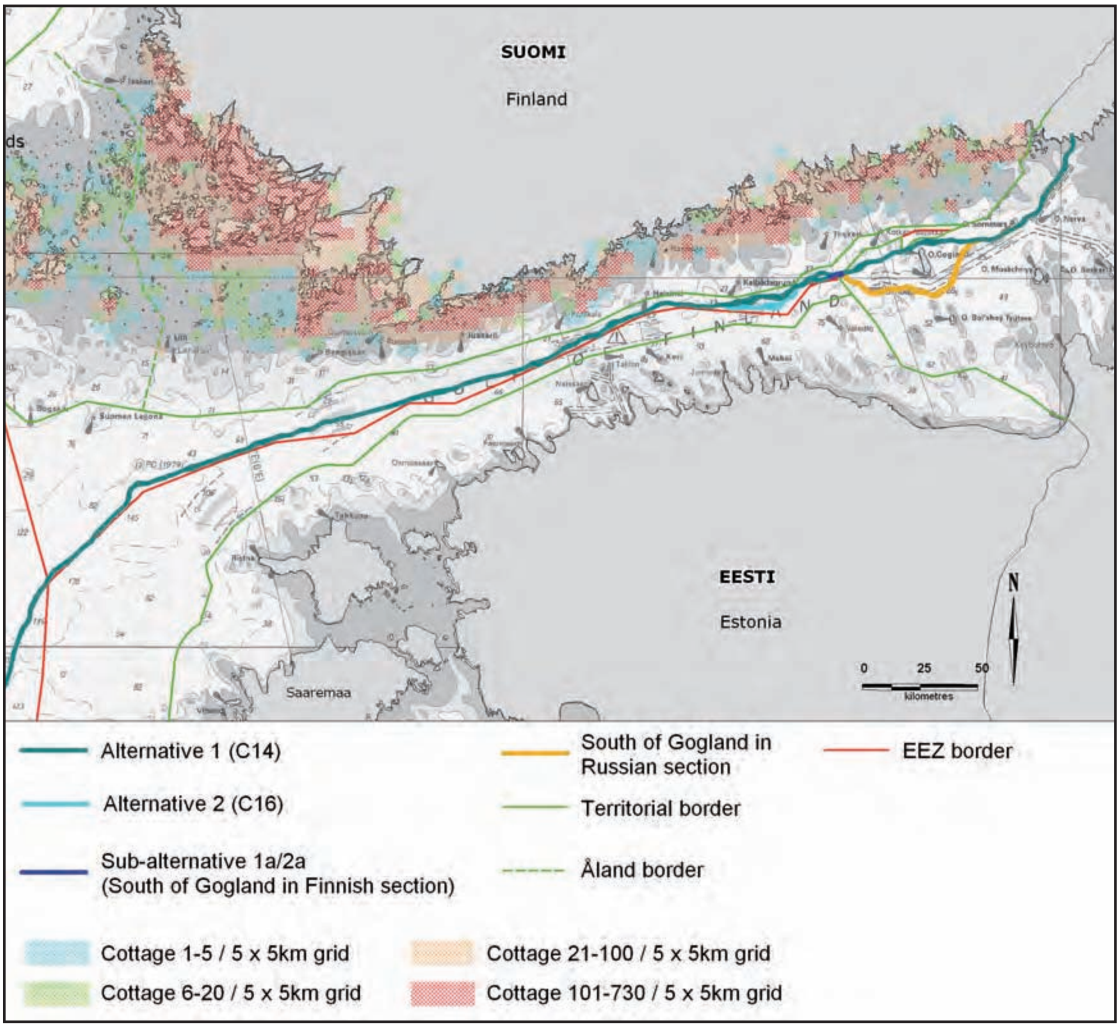

Figure 5.85. Summer cottages on the Finnish coast (see text).

5.6.4 Military areas

5.6.4.1 Overview

After 1945, the Baltic Sea served as a border between opposing military blocks. As the dividing line between Warsaw Pact nations on one side and members of NATO on the other, the Baltic Sea became an important strategic area. Large areas of territorial waters were restricted areas of military importance. Although international politics has changed, the Baltic Sea remains a strategic area, but the balance has shifted from military interests to logistic/commercial interests.

The Baltic countries maintain various types of military practice areas at sea. The areas can be classified according to use, as shown in Table 5.39. Military practice areas are divided into these classifications in Atlas Map MI-1-F.

Table 5.39. Types of military practice areas in the Baltic Sea.

Military practice areas	Definition
Firing danger area	Area, either permanent or temporary, with firing ranges for artillery, bombing, torpedo and missile exercises
Mine-laying practice and counter-measures area	Area within which the national navies carry out mine-laying exercises (underwater mines)
Submarine exercise area	Area in which submarine exercises are carried out. The submarines may be surfaced or submerged during exercises.
Air force exercise area	Restricted air space dedicated to air force exercises. Mariners and fishermen will be alerted of temporary, potentially hazardous conditions as a result of military exercises before a military exercise.
Other exercise area (unclassified)	Military practice area that has not been classified by the information source, but is either a firing danger area, a mine-laying practice area or a submarine exercise area

Military practice areas may be restricted with regard to navigation and other rights. Countries may permanently restrict access to areas used for military purposes within their territorial waters but not within their EEZ. There may be varying interpretations of the validity of the restrictions and possible infringement on the rights of innocent passage through territorial waters and elsewhere /288/. Temporary practice areas are generally not indicated on sea charts due to their classified and temporary status. Information on locations of these areas has been obtained for some parts of the Baltic Sea.

5.6.4.2 Military areas along the Finnish project area

There are several military areas in the vicinity of the proposed pipeline route (see Figure 5.86), and these can be divided into three types: actual military areas, restricted areas and firing danger areas /289-291/.

The actual military areas are specified land areas (islands and islets) used by the Finnish Defence Forces in Finnish territorial waters. It is by law strictly forbidden to land on them without permission. Since these areas are located in territorial waters it is not necessary to include them in a more detailed assessment.

The restricted areas located in Finnish territorial waters are military areas considered essential to Finnish national security and territorial surveillance. There are in all 19 restricted areas in the Gulf of Finland between Kotka (Haapasaari) and Turku. They are established by government decree. The areas are carefully determined with boundaries and coordinates. Movement and other activities are restricted in such areas. /289, 290/.

According to Section 16 of Territorial Surveillance Act the following activities are not allowed in a restricted area without permission /289/:

1. Scuba diving or other underwater activity which does not normally form part of navigation;
2. Fishing with fishing tackle dragged along the bottom or heavy tackle anchored at the bottom, such as a seine, trawl or large bow net;
3. Anchoring a vessel other than a pleasure craft outside an anchorage marked on Finnish sea charts, unless this is necessary for reasons of navigational safety, force majeure or an emergency;
4. Movement in a public water area outside a public fairway within 100 meters of land areas which are used by the Defence Forces and where landing is marked as forbidden by law.

The firing danger areas are in the use of Finnish Defence Forces for training activities. The firing danger areas can extend to the Finnish EEZ, although they primarily are confined to territorial waters. All the areas are determined by coordinates. In the Gulf of Finland in the vicinity of the planned pipeline route the Defence Forces have 28 specified firing danger areas, which form three continuous areas. Five of the firing danger areas extend to the Finnish EEZ. /291/

Military practice areas in the Gulf of Finland are shown in Atlas Map MI-1-F.

According to Finnish Defence Forces their practice and firing activities are mainly limited within Finnish territorial waters. Activities in the EEZ are territorial surveillance duties or practice activities by Finnish Defence Forces, which do not have any effects on the planned pipeline route. It is still to notice that the planned Nord Stream pipeline passes through a stretch of a firing danger area, named Örö D52, in the Finnish EEZ. There are also other firing danger areas close to the pipeline route such as the area Katajaluoto D34, Kuivasaari D25 and Isosaari D24. These firing danger areas are indicated on Figure 5.86. /291, 292/.

Furthermore, the designated firing danger areas have been made broad enough to maintain a safe distance between maritime traffic and firing activities. During practice activities the firing range cannot reach close to the boundaries of the firing danger areas. This has been ensured by technical preparation of weapon systems that are followed strictly by safety regulations. The ammunition used in exercises in the firing danger areas by Navy or Artillery is surface ammunition or missiles, which do not have impacts on the seabed /293/.

The mine-laying practices by the Finnish Navy do not require specific practice areas in the Gulf of Finland. The mines used during exercises are light practice mines and do not contain explosives; therfore they do not have any significant impacts on objects on the seabed. These practice mines are equipped with floats in order to locate them after exercises /293/.

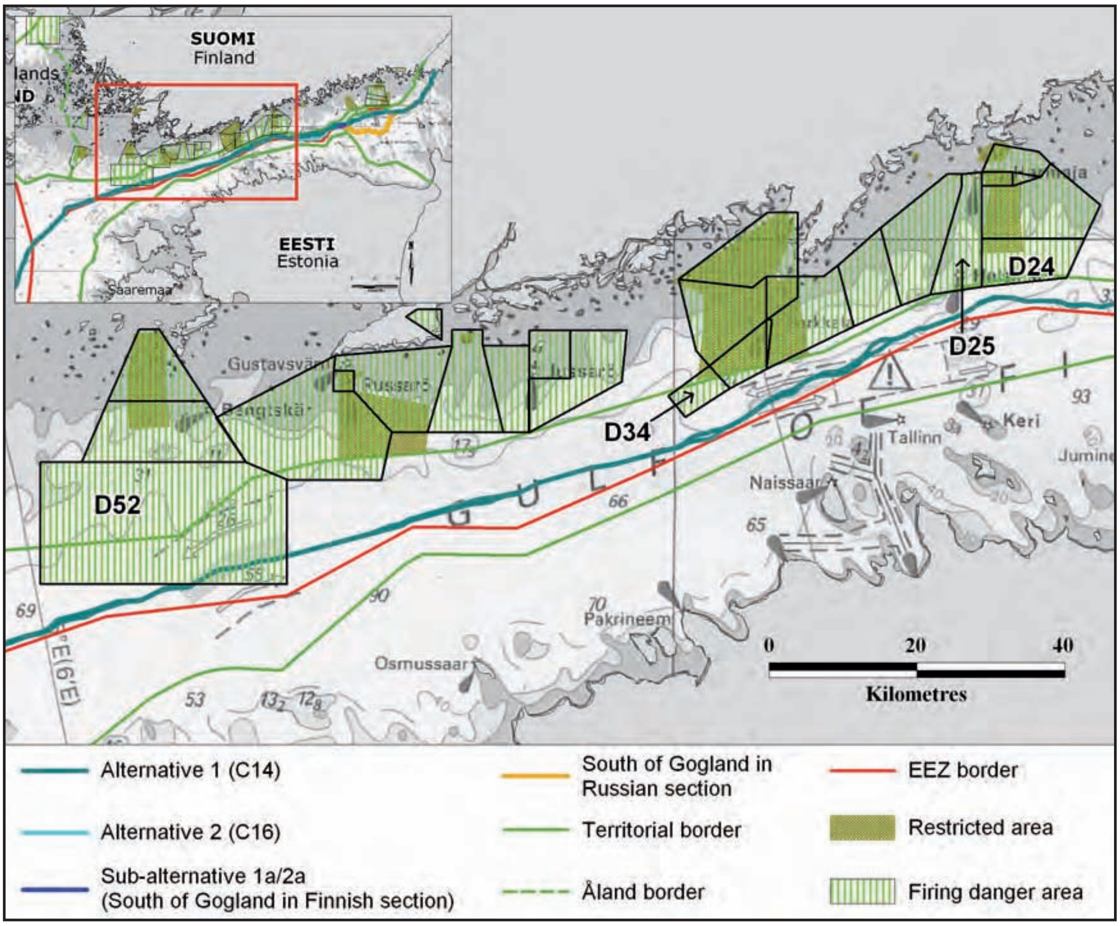

Figure 5.86. Restricted areas and firing danger areas in Gulf of Finland including the firing danger areas Örö D52, Katajaluoto D34, Kuivasaari D25 and Isosaari D24.

5.6.5 Conventional Munitions

5.6.5.1 Overview

Historically, the dumping of munitions at sea has been a convenient means of disposing of munitions that no longer have any military value. The Baltic Sea is no exception, and it was used as a dumping ground for conventional and chemical munitions during and subsequent to both World War I (WWI) and World War II (WWII).

The Gulf of Finland was of significant strategic naval importance, and during WWI and WWII sea mines were used extensively with other munitions, like depth charges, grenades and torpedoes, that were deployed or dropped during wartime. To this day naval exercises are undertaken in the Gulf of Finland in relation to the removal of mines, and there are designated military practice areas where live munitions are blasted.

This section provides background information on the types of conventional and chemical munitions that have been dumped in the Baltic Sea and describes the munitions finds from the most recent munitions screening survey, which was conducted during 2007/2008.

Conventional munitions

Thousands of sea mines were deployed during both WWI and WWII as a defence mechanism against attack from enemy naval ships and submarines. The closure of the Gulf of Finland was of special interest and therefore the largest quantities of sea mines were deployed here. The mines were put out in barrages to prevent enemy ships from approaching the coasts or entering harbours; they were deployed mainly by the German, Finnish and Russian navies. Submarine nets were also used in the Gulf of Finland to prevent submarines from entering certain areas and harbours.

Several types of sea mines were used during wartime, with contact mines being the most common. Contact mines are designed to explode when triggered by direct impact with an enemy ship or submarine. There are generally three types of contact mines:

- Moored contact mines
- Bottom contact mines
- Drifting contact mines

Moored contact mines (see Figure 5.87) are connected to a release system lying on the seabed that prevents the mines from drifting away. The mines can be set to float on the surface or be suspended in the water column.

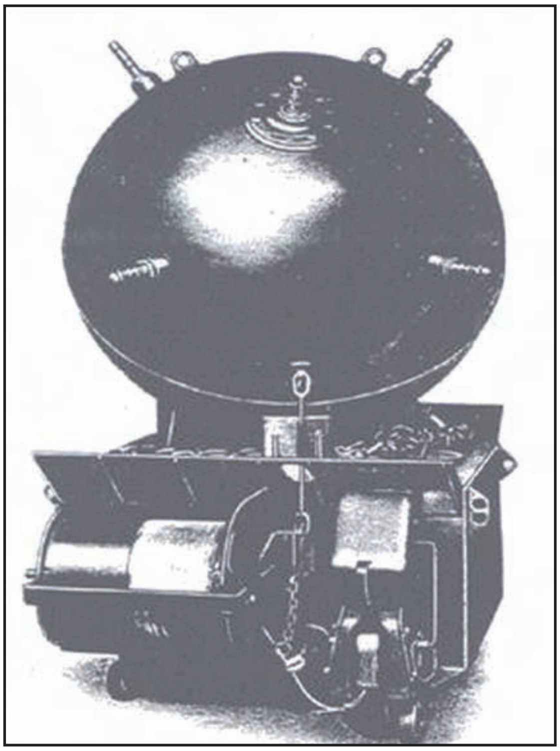

Figure 5.87. Example of a moored contact mine. The mine is triggered when a ship hits the protruding Hertz horns.

Bottom contact mines, as their name indicates, lie on the seabed. They are the simplest of mines and are primarily designed to be used against submarines. They are detonated when a submarine comes into direct contact with the mine.

Drifting contact mines drift at the sea surface without a wire or anchor attached. Such mines are said to have been used during WWI and WWII, but no records have been found regarding their use in the Baltic. However, it was not unusual for moored mines to break their tether and drift in the surface waters.

Mines with more sophisticated pressure and magnetic sensors were also used. These mines were triggered when in vicinity of the magnetic field, pressure wave or sound created by a passing ship or submarine.

After both WWI and WWII the known mine fields in the Gulf of Finland were swept. However, many mines remain to this day. Atlas Map MU-1-F shows the location of abandoned minefields and areas in the Gulf of Finland where there is a risk of sea mines. Unfortunately these maps are not complete, as information for some areas has not been released by the Naval Commands.

During both world wars, other munitions objects like depth charges, torpedoes and grenades were used and dumped throughout the Baltic. Exact records of where munitions were dumped are unavailable, and this emphasises the importance of undertaking a munitions screening survey of the proposed routes for the Nord Stream pipelines, as it will reveal whether any unexploded ordnance or mines are present along the installation corridor.

Chemical munitions

Large amounts of chemical munitions were dumped in the Baltic Sea during and after WWII. It is estimated that approximately 40,000 tonnes of chemical munitions, containing approximately 13,000[1] tonnes of chemical-warfare agents, were disposed of by dumping in the Baltic Sea. The chemical munitions were mainly dumped in the southern part of the Baltic Sea and therefore do not affect the Nord Stream pipeline in the Finnish EEZ. About 12,000 tonnes were deposited in a dumping area east of Bornholm, and 1,000 tonnes were dumped at a location south-east of Gotland. Figure 5.88 below shows the location of these dumping sites. /294, 295/

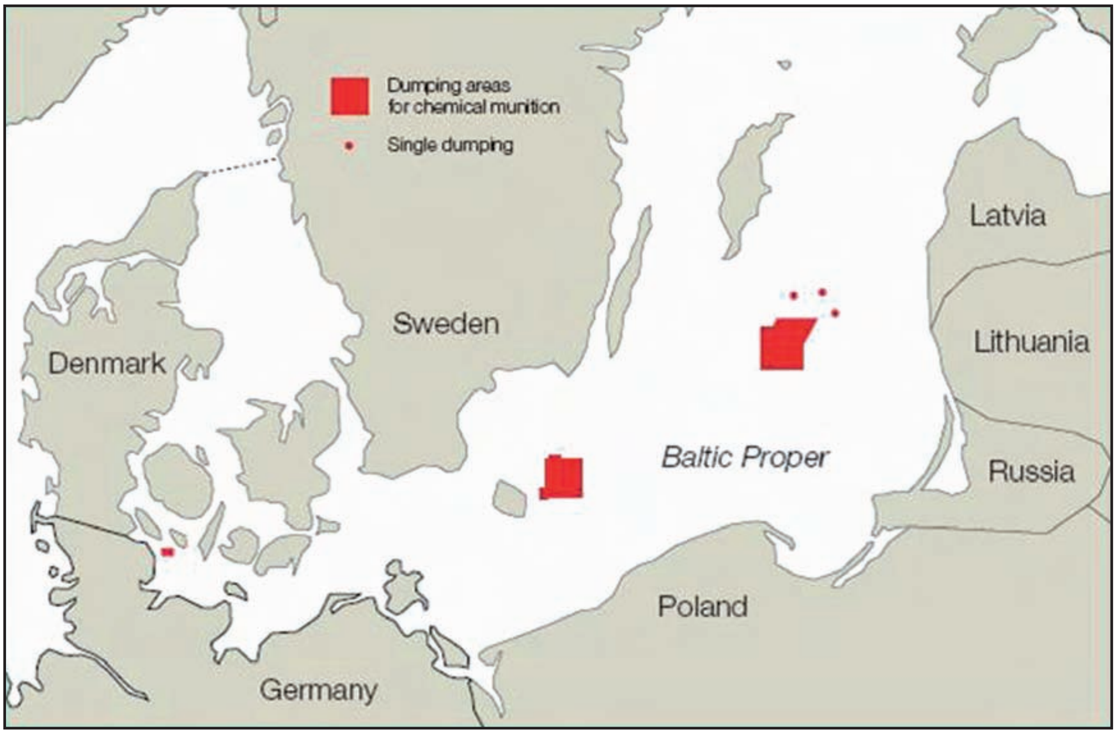

Figure 5.88. Dumping areas for chemical-warfare agents in the Baltic Sea /43/.

5.6.5.2 Munitions in the Finnish project area

The survey campaigns identified a number of munitions-related objects. In the following section the findings in the Finnish EEZ are presented.

1 Chemical warfare agents refer to the chemical compound used in chemical munitions.

Munitions inspections were initially carried out as a part of the geophysical survey in 2006 by Petergaz. These initial munitions screening inspections were not run as a continuous operation, and on one occasion a mine was found when the remotely operated vehicle (ROV) relocated from one target position to another. On this basis a more thorough and detailed geophysical and munitions screening survey was planned and launched in 2007. This new survey comprised continuous munitions screening using a specially developed gradiometer system together with detailed inspection of objects along each of the two Nord Stream pipeline routes within a corridor width of +/- 25 m. See Section 5.1.3 for further details on the munitions screening surveys. For a description of munitions clearance procedure please refer to the Chapter 3.5.

Results from munitions screening

Pipeline Route C14

The munitions screening survey identified 29 objects as munitions. Of these, 24 were confirmed as mines, one as a possible mine, two as possible small air-dropped bombs and two as SPB D obstructer mines. Also identified long this route were other items related to the deployment of mines, including eight mine chairs/mine releasing systems.

Pipeline Route C16

Altogether 31 munitions items were identified along the Route C16; however, the two additional findings compared to the route C14 could not be confirmed due to poor underwater visibility. These two targets have been identified as possible mine and possible munitions related. They may require further identification at a later date. The rest 29 munitions findings are the same as along the route C14.

Table 5.40 gives an overview of the munitions objects identified in the Finnish section of the Nord Stream pipeline route.

Table 5.40. Number and type of munitions objects identified in Finland during the munitions screening survey 2007/2008. The table specifies the objects found on the routes C14 and C16, respectively. /296/.

Routes	Mines	Possible mines	Other unitions	Mine chairs / releasing systems	Total
Pipeline Route C14	24	1	4	8	**29**
Pipeline Route C16	24	2	5	8	**31**

The mine chairs and releasing systems do not pose any risk to the pipeline installation, as these devices do not contain any explosives; the same is true for the submarine nets and buoys.

The positions of the munitions objects that do pose a possible danger to the Nord Stream pipelines are shown in Figure 5.89.

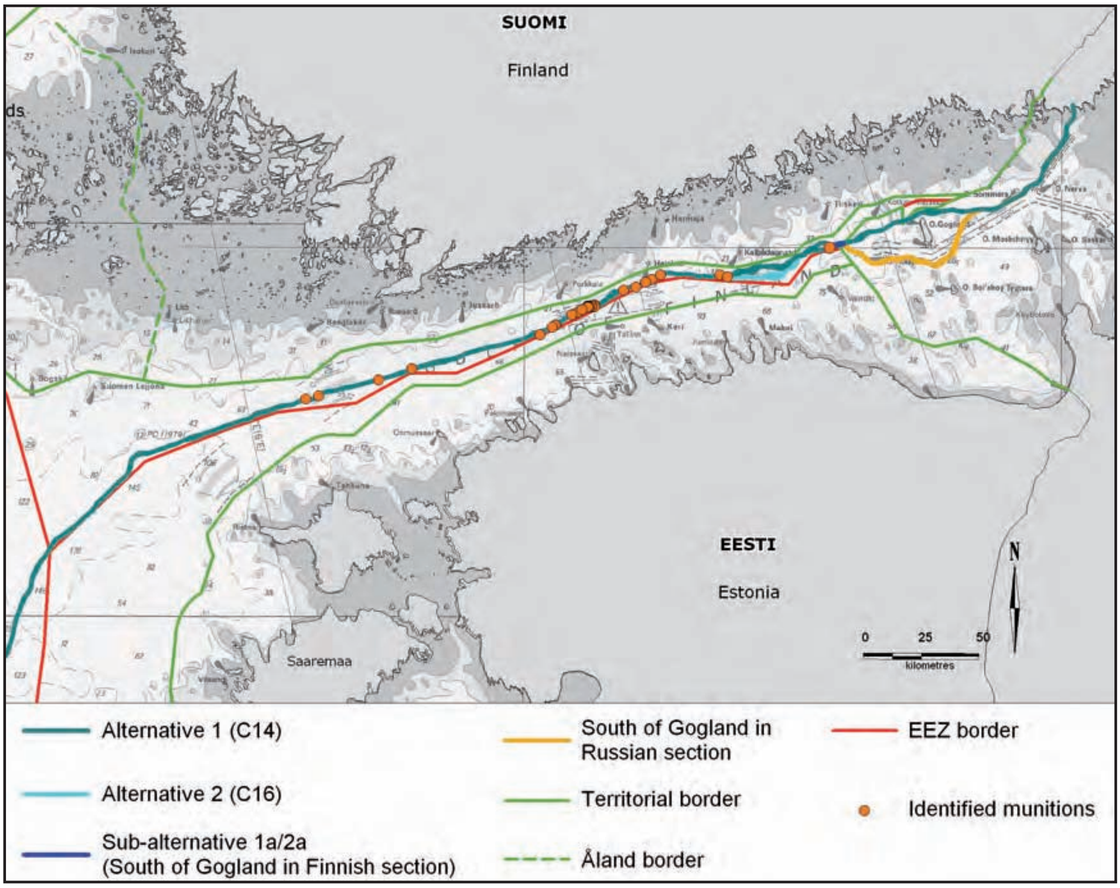

Figure 5.89. Positions of the munitions found in the Finnish project area of the Nord Stream pipeline routes (C14 and C16) during the munitions screening survey 2007/2008. /297/

Following there are four examples (Figures 5.90 – 5.93) of the targets with historical technical documentation to describe the mine type and the potential explosive charge. For more figures of the munitions findings along the Nord Stream pipeline routes in Finnish EEZ please refer to Atlas Maps MU-3a-F and MU-3b-F.

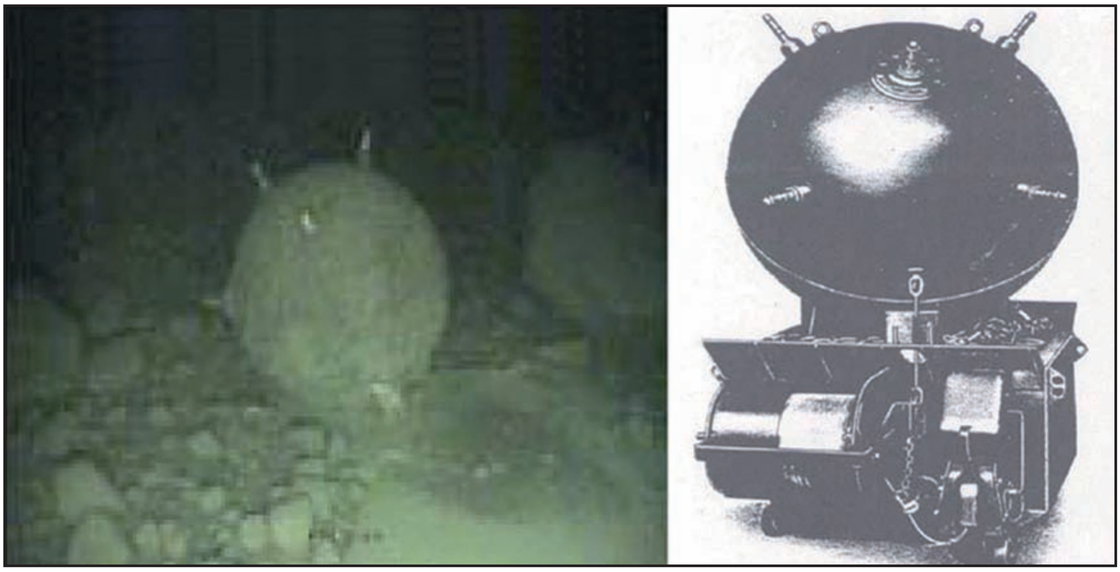

Figure 5.90. Target R-8AG-W-014, German moored contact mine type EMC. Charge 250/300 kg Hexanite /297/.

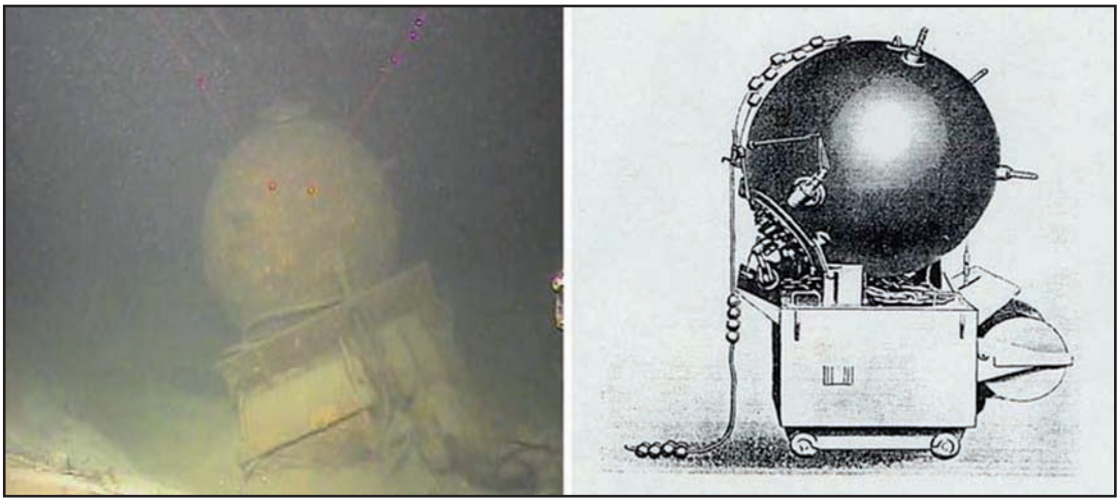

Figure 5.91 Target R-12-3463, Mine with mine anchor mechanism located in a deep scoured hollow surrounded by a flat seabed of soft gyttja clay. Identification: EMC I + II German WW II moored contact mine, Charge 320 / 250 kg Hexanite. /297/

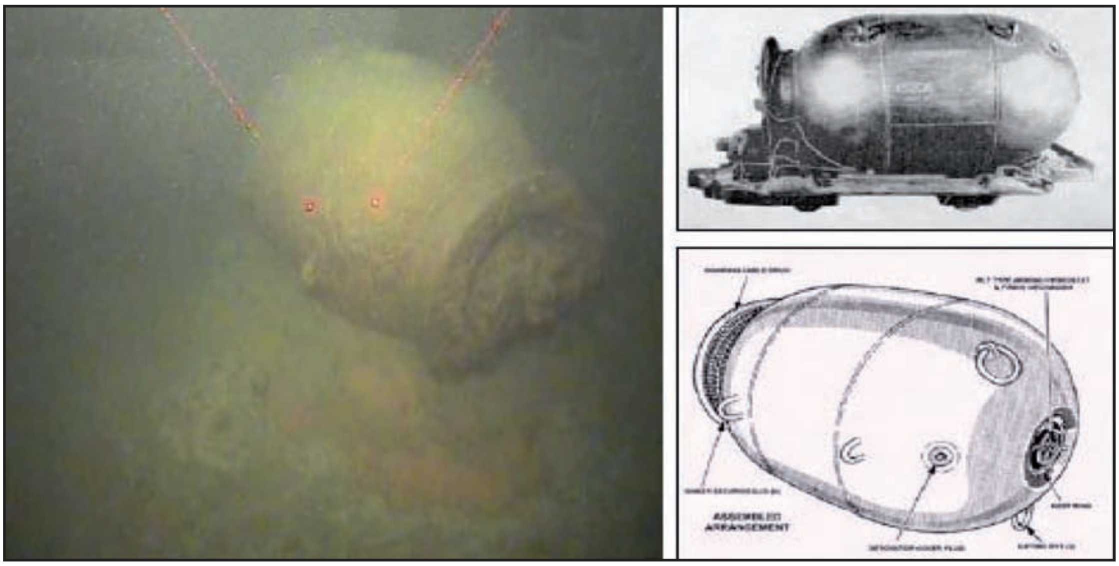

Figure 5.92. Target R-11-5167, Cylinder with a hemispherical base - Lifting eyes fixed to sides. Russian moored contact mine M26, Pendulum firing mechanism, Charge 240 kg TNT. /297/

Figure 5.93. Target R-09-04, WWII Mine line anti-sweep explosive device, conical casing with rounded base resting on the possible remains of its deployment system in a scoured hollow on a seabed of sandy clay. Identification: SPB D German Obstructer Mine, Charge 0.8 kg, External features push / drag sensor. /297/

Tables 5.41 and 5.42 list all the munitions findings in Finnish EEZ along the planned Nord Stream pipeline routes. The tables show target reference identifications, distances to the closest pipeline and the descriptions of the munitions (a mine, a possible mine or other munitions).

Table 5.41. Munitions findings in the Finnish EEZ along the Nord Stream pipeline route C14. The table states the object's identification number, distance to the closest pipeline (south-east SE or north-west NW) and a description of the find /296/.

Ref.	Distance to pipeline (SE/NW)	Description
R-5-2437	12.34 m (SE)	Possible Mine
R-06-003	4.26 m (NW)	Mine
R-E7B-10466	4.07 m (SE)	Other munitions (Obstructer mine)
R-8AG-W-017	0.85 m (NW)	Mine
R-07-004	2.6 m (NW)	Mine
R-07-2655	11.54 m (SE)	Mine
R-8AG-W-014	2.93 m (SE)	Mine
R-8AG-W-009	0.99 m (NW)	Mine
R-E8C-10223	20.9 m (SE)	Mine
R-W8A-10317	24.6 m (SE)	Mine
R-8CG-E-004	4.2 m (SE)	Mine
R-8CG-E-003	7.96 m (NW)	Mine
R-W8A-10312	24.45 m (SE)	Mine
R-W8A-10313	21.83 m (SE)	Mine
R-08-009	3,65 m (NW)	Mine
R-W8A-10005	1.86 m (SE)	Mine
R-8CG-E-002	2.01 m (SE)	Mine
R-8CG-E-001	11.13 m (SE)	Mine
R-08-159	7.0 m (NW)	Mine
R-08-2805	22.16 m (SE)	Mine
S-09-3135	1.01 m (NW)	Mine
R-09-192	1.67 m (SE)	Mine
R-09-04	2.79 m (NW)	Other munitions (Obstructer mine)
R-09-27	3.71m (SE)	Mine
R-11-3395	15.84 m (NW)	Mine
R-11-5167	13.8 m (SE)	Mine
R-12-3463	11.36.m (NW)	Mine
R-12-008	3.1 m (NW)	Other munitions (2 small bombs)

Table 5.42. The two additional munitions findings along the Nord Stream pipeline route C16 compared to the route C14. The table states the object's identification number, distance to the pipeline route C14 and a description of the find /296/.

Ref.	Distance to pipeline C14	Description
R-E6E-10480	709.17 m	Possible mine
R-E8D-10028	634 m	Possibly munitions- related

During the inspections of the objects the underwater visibility was poor. Targets may require further identification at a later date.

Please note that although there are 29 (C14) and 31 (C16) munitions findings there are only 28 and 30 target ID-references because the target R-12-008 contains two bombs. The munitions identified in the Finnish EEZ are presented in Atlas Maps MU-3a-F and MU-3b-F.

5.6.6 Other Survey Objects

5.6.6.1 Overview

During the performance of the munitions screening survey various items of debris were observed. Significant as a potential environmental hazard are the observed barrels.

The following subchapter presents the barrels that were observed during the 2007/2008 Munitions Screening Survey /296/. First there is a description of the results from the screening survey (amounts and locations) in Finnish project area. Additionally there is a more detailed analysis of barrel findings which categorizes the findings based on their type and condition. For brief assessment of environmental risks of barrel findings please refer to Chapter 9.3.3.3.

5.6.6.2 Barrels in the Finnish project area

Results from the screening survey

Visual inspection of seabed targets revealed the presence of 34 barrels along the pipeline route C14 and 27 barrels along the pipeline route C16. One of the 27 barrels was found along the section, where the route C16 deviates from the route C14.

Pipeline Route C14

Each of the 34 barrels found from the route C14 was the subject of a full visual survey to determine the location and condition. Additionally, an effort was made to observe the contents (if any) of the barrel. The majority of these barrels are lying flat on their side, partially buried in the seabed sediments. The exceptions are R-05-2455 and R-07-5051 which are sitting upright, partially buried in the seabed.

Two of the barrels have been identified as being of non-typical construction and may be munitions or mine related items. One (R-07-5051) may be a mine release system, and the other (R-08-2938) may also be a mine release system or a depth charge.

Two barrels have been identified as being plastic barrels of the type typically used for storing fertiliser (R-05-2447 and R-05-2448).

Eight of these barrels are within the section that traverses Kalbådagrund, and are therefore not on Alternative 2 alignment.

Ten of the barrels are located within the installation corridor i.e. within 7.5 m of the pipeline alignment.

The barrels have been classified in Table 5.43 and a detailed listing of barrels located along the pipeline route Alternative 1 (C14) is presented in Appendix VII A.

Pipeline Route C16

From the 27 barrels found along the route C16, 26 are the same as along the route C14. Visual inspection of targets along the route C16 revealed the presence of one barrel in the section that passes to the south of Kalbådagrund. This item was the subject of a full visual survey to determine its location and condition.

The barrel (R-E6E-10505) is laying partially buried flat on its side. The barrel appears to be in good condition, covered with a thin layer of marine sediment or growth.

Six of the barrels along the route C16 are located within the installation corridor i.e. within 7.5 m of the pipeline alignment.

The barrels have been classified in Table 5.43 and a detailed listing of barrels located along the pipeline route Alternative 2 (C16) is presented in Appendix VII B.

Table 5.43. Classification of Barrel Types.

Routes	Standard Metallic 45 gallon	Other Metallic Barrels	Possibly related to Mine Activity	Plastic Fertiliser Type Barrels	Badly Corroded Deformed or Partial Barrels	Total	Total within +/- 7.5m
Alternative 1 (C14)	23	3	2	2	4	34	10
Alternative 2 (C16)	23	0	2	0	2	27	6

The locations of the observed barrels along both route alternatives are presented in Figures 5.94 and 5.95.

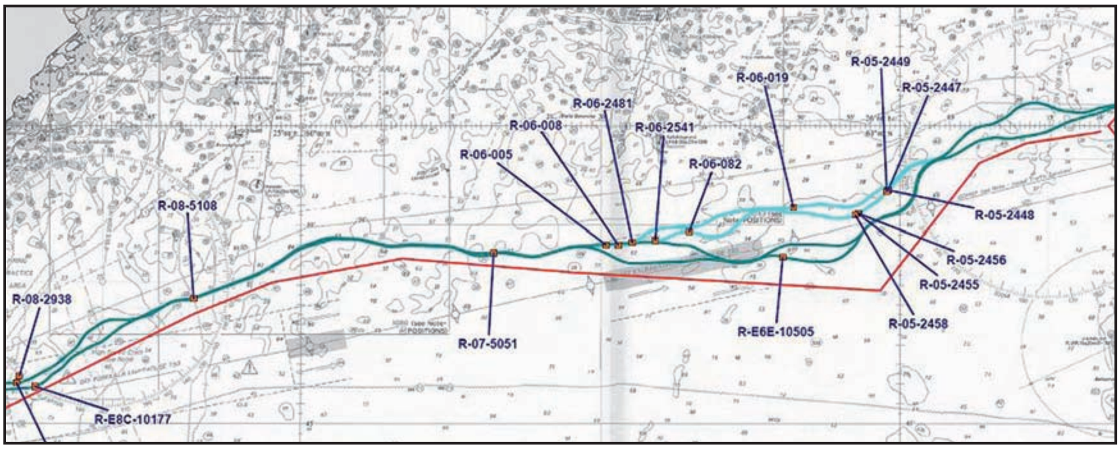

Figure 5.94. Barrels Located in Eastern Gulf of Finland.

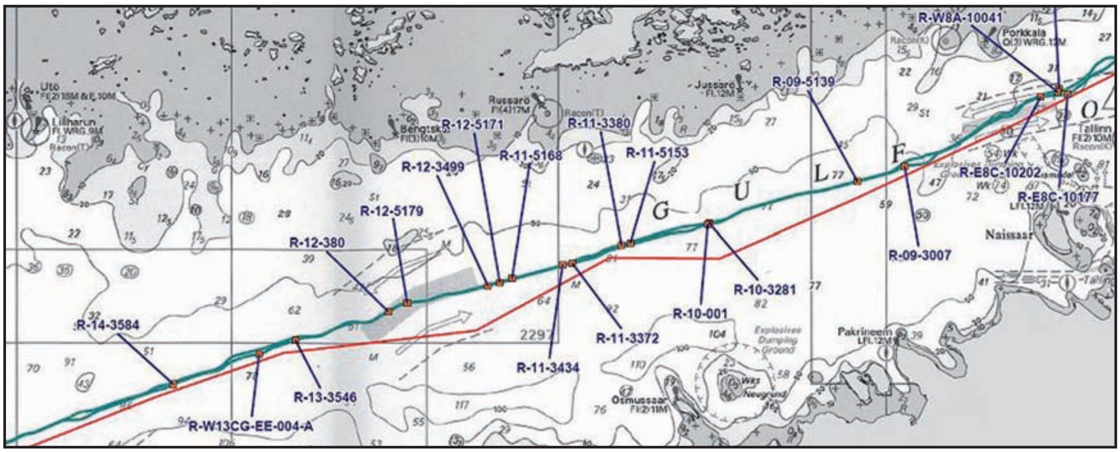

Figure 5.95. Barrels Located in Western Gulf of Finland.

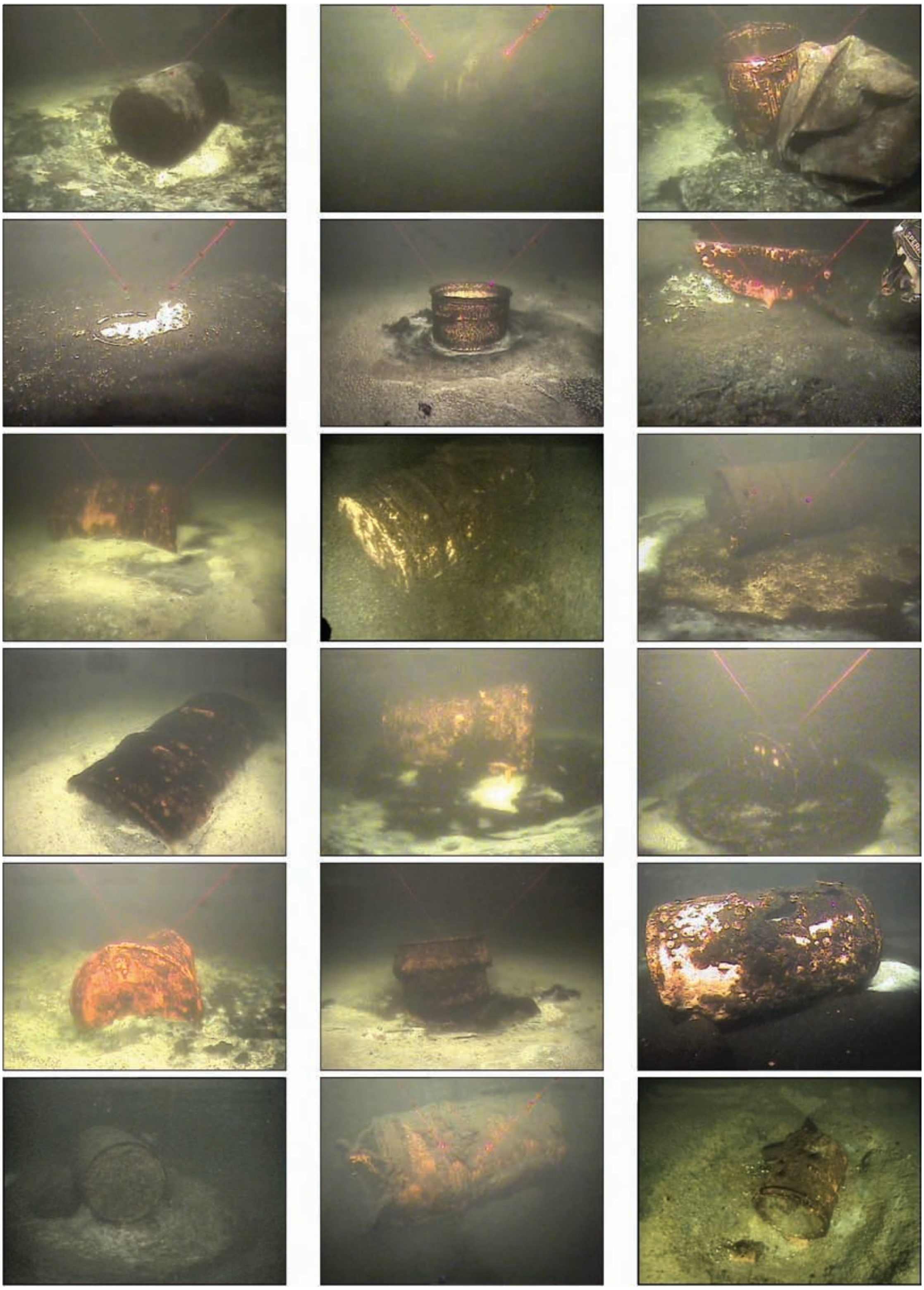

Figure 5.96. Examples of underwater images of the barrel objects that were identified along the Finnish section of the planned Nord Stream pipeline route.

Description of the barrels

According to the videos (2 min – 30 min) recorded by the ROV's the barrels can be put in the following categories:

Category 1: Fully open, damaged drums

These drums (volume 50 – 100 L) have been lying on the seabed for a long time and are heavily corroded. There is not much of material inside. Total number of these drums is 5 (15 %). See examples of the drums in Figure 5.97.

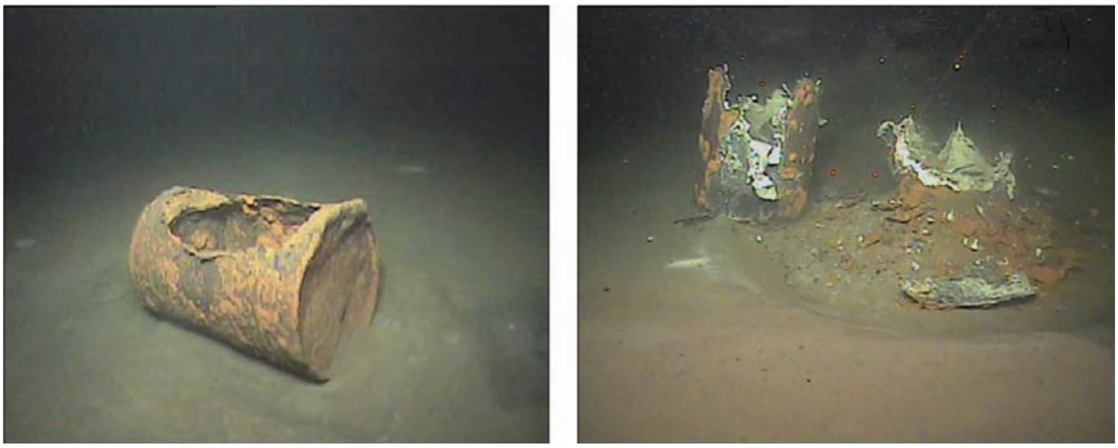

Figure 5.97. Examples of fully open 150 – 200 L drums.

Drums of category 1 are open and contain materials only in solid form. The maximum amount of potentially hazardous materials is small and depending on the drum about 5 - 30 kg. The material inside the drums is most likely in highly insoluble form.

Category 2, Open drums with solid material inside

These drums (volume 50 - 250 L) are vessels of which one end is open (e.g. open-top drum). They lie on the seabed either vertically or horizontally and contain solid material (original material and/or sediment) about 5 – 90 % of the volume. Total number of these drums is 19 (56 %). See examples of the drums in Figure 5.98.

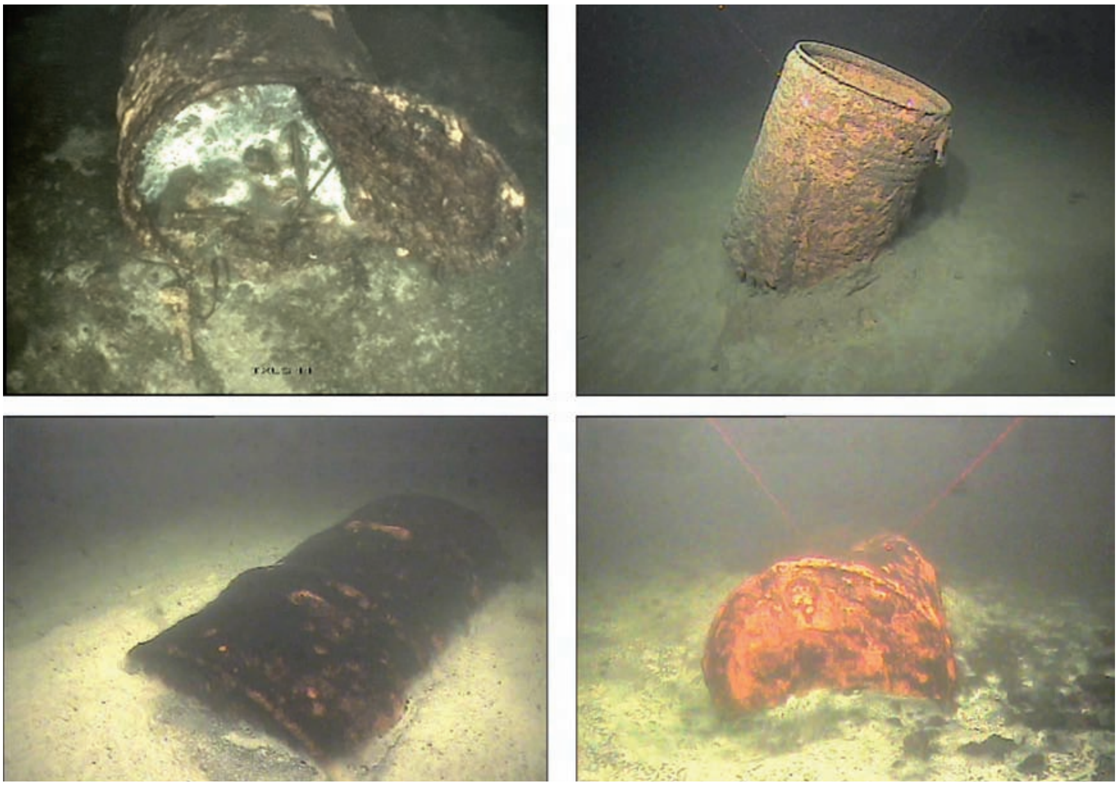

Figure 5.98. Examples of open drums: 200 L drum nearly full of solid material (top left). 130 L drum with approximately 50% of solid material (top right). 200 L drum buried in the seabed, open end not seen in the picture (down left). 200 L drum open left side (down right).

Drums of category 2 are open and in practice can contain materials only in solid form. In 1/3 of the drums the amount of solid material is about 10 – 50 kg. In 2/3 of these drums (10 pcs.) the amount of solid material may range from 100 kg to maximum 300 kg. The material in these drums is assumed to be very slightly soluble.

Category 3, Drums with open cap-hole

These drums (volume 2 pcs. á 40 L and 5 pcs. á 200 L) are former vessels presumably for liquid materials. They all lie horizontally on the seabed. When disposed into the sea the cap has been removed. Two of the drums also have an extra hole. One drum has several holes (10 - 20 mm) punctured on its side. No observations could be made of the present content. Total number of these drums is 8 (24 %). See examples of the drums in Figure 5.99.

One barrel in Figure 5.99 (top left) had contained hydraulic oil (Castrol HYSPIN AWH-M46, Batch nr. 1215019, 26/09/06), but as the cap is missing it is assumed that not much original material was in the barrel at the time of disposal. Most probably the situation is the same with other 7 drums of this category; hole(s) made sure that an empty drum sinked.

If there has been material in the drums, it was likely in liquid or semi-liquid form. In this case liquids lighter than water have probably escaped from the drums because in all of the 200 L drums the hole is well above the horizontal centreline of the drum. If the content has been water based solution or liquid heavier than water the present amount could be nearly 80-90% of the volume.

Figure 5.99. Examples of drums with holes: 200 L drum, former hydraulic oil drum (top left). 200 L drum (top right), 200 L drum with several small holes (down left). Approximately 40 L open "bottle" (down right).

Category 4, Drums with no openings

These are drums and barrels (volume approximately 200 l), which may not have any openings. The vessels are either open-top drums with closed lid or barrels with caps on (no cap-seals observed). All lie horizontally on the seabed. Total number of these drums is 2 (6 %). See Figure 5.100.

Videos of these drums do not show both ends of the drum, and therefore the other end could be open.

If the drums of category 4 are closed they are quite full of "original" materials, either in liquid, semi-liquid or solid form. The amount of material is more than about 180 kg in each of these 3 drums.

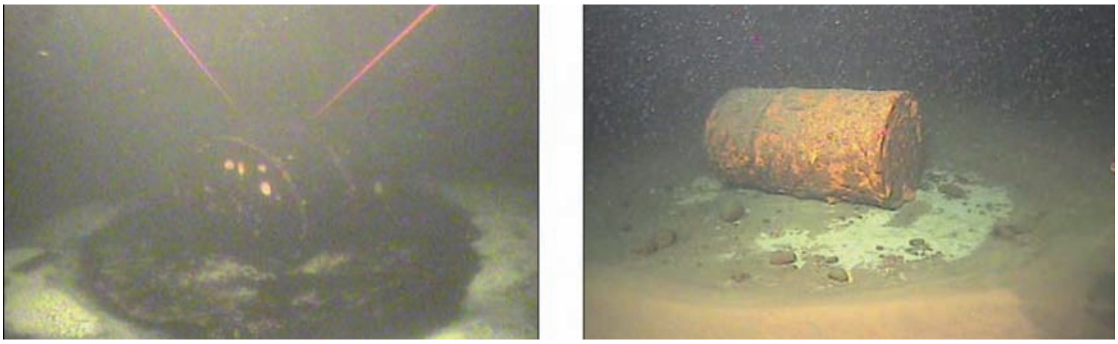

Figure 5.100. Possibly unbroken drums.

5.6.7 Existing/planned infrastructure and utilization of natural resources

5.6.7.1 Overview

This chapter describes the existing infrastructure and use of natural resources in the Finnish EEZ and territorial waters. The issues addressed include cables, pipelines, wind park areas and raw material extraction areas. In addition to describing the present situation also some aspects of the future development has been included. In future the development of infrastructure in Finland will also increase the utilization of the Gulf of Finland.

5.6.7.2 Cables

There are several electrical and telecommunications cables on the seabed of the Gulf of Finland and the Baltic Sea. The detailed Nord Stream marine surveys performed by Marin Mätteknik Ab (MMT) in 2007 and 2008 compiled cable information in autumn 2008. The surveys identified 38 cable crossings along the planned pipeline route C14 in Finnish EEZ (including crossings of inactive and unidentified cables).

Some of the inactive cables detected in the field survey are not indicated on recent sea charts. The field survey detects all cables on the seabed, whereas a complete high voltage direct current (HVCD) cable system consisting of two single MCR cables and one single HVDC cable would be represented by only one line on a sea chart.

All cables crossing the planned pipeline route in the Finnish EEZ are presented in the following table (Table 5.44). The cables are listed in order of detection from the Russian EEZ border to the Swedish EEZ border, regardless of their status. Please note that every cable indicated on Table 5.44 below has crossing points with both of the planned Nord Stream pipelines (south-east and north-west), unless otherwise mentioned.

Table 5.44. Cable crossings on Route C14 in the Finnish EEZ, according to surveys performed by Marin Mät-teknik Ab /298/.

Name	Route	Type	Status
UCCBF	St Petersburg (RUS) – Kaliningrad (RUS)	Telecom	Active
UCCBF	St Petersburg (RUS) – Kaliningrad (RUS)	Telecom	Active
UCCBF	St Petersburg (RUS) – Kaliningrad (RUS)	Telecom	Active
Jollas – Leningrad	Jollas, Helsinki (FIN) – St Petersburg (RUS)	Telecom	Inactive
FEC 2	Lauttasaari, Helsinki (FIN) – Randwere (EST)	Telecom	Active
Unidentified 1	-	-	-
EE-SF2	Kaivopuisto, Helsinki (FIN) – Leppneeme (EST)	Telecom	Active
Unidentified 1	-	-	-
Pangea Seg 3	Helsinki (FIN) – Tallinn (EST)	Telecom	Active
Tallin-Helsinki	FIN – LAT	Telecom	Inactive
Tallin-Helsinki	FIN – LAT	Telecom	Inactive
Unidentified 2	-	-	-
EE-SF3	Lauttasaari, Helsinki (FIN) – Meremoisa (LAT)	Telecom	Active
Estlink	FIN – EST	Power	Active
FEC 1	Porkkala (FIN) – Kakumäe (EST)	Telecom	Active
UCCBF	St Petersburg (RUS) – Kaliningrad (RUS)	Telecom	Active
Pangea Seg 3	Hiiumaa (EST) – Sandhamn (SWE)	Telecom	Active
EE-S1	Tahkuna (EST) – Stavsnäs (SWE)	Telecom	Active
Libau – Jollas	LAT – FIN	Telecom	Inactive
Libau – Jollas	LAT – FIN	Telecom	Inactive

Note that the Russian military telecom cable UCCBF is listed four times in Table 5.44; it is a single cable, but it has altogether six crossing points on the planned pipeline route. First and fourth UCCBF in the table crosses both of the planned pipelines (south-east and north-west) whereas second and third UCCBF in the table crosses only the north-west route.

Notifications by surveyor

- Inactive cable Jollas - Leningrad is listed on basis of older sea chart information only. /298/
- The cable Unidentified 1 was detected by sidescan sonar (SSS) survey, remotely operated vehicle (ROV) survey and cable detector (CT). No cable owner who has been contacted has reported a cable at this position. On the CT survey, other cable debris (second Unidentified 1 in the table) was detected in the area west of this cable. /298/
- The cable Unidentified 2 was detected by SSS, ROV and CT, but its origin and identity are unknown. It may be only part of a cable. /298/
- The inactive Libau – Jollas cables are indicated only on basis of published, third- party data. They were not detected in the surveys. /298/

The existing active cables are indicated in Atlas Map IN-1-F.

The survey data also presents telecom cables in the Finnish EEZ that do not cross the pro-posed pipeline route. According to the data, four of these cables have sections inside the distance of 3,000 metres from the planned pipeline route. The cables are: BCS B3 between Helsinki (FIN) and Kotka (FIN), UES F1 and UES F2 between Helsinki and Hanko (FIN) and BCS North Phase II between Helsinki and Hanko. However, because they do not cross the pipelines or enter the immediate vicinity of the pipelines, it is not relevant to include them in a detailed assessment /40/.

In addition to the existing cables there also are three cables under planning in the Gulf of Finland:

- Telecom cable (owner IP-Only) Helsinki (FIN) – Tallinn (EST) – Hanko (FIN) – Kökar (FIN) – Stockholm (SWE). This cable would cross planned pipeline route twice. The cable project is at the stage that the environmental permit application procedure has been established and the marine survey applications have been delivered. Aim is that the cable would be laid during the year 2009 which means that the cable would be active before the planned pipeline. /24/
- Power cable Estlink II from Estonia to Finland. The 600-800 MW cable is planned to be ready in 2012. The route of the cable is not decided officially yet, but it would cross the planned pipeline once. According to preliminary plans the landing place in Estonia would be at Aseri. The landing place in Finland has not been decided yet. /25/
- A Russian telecom cable from St. Petersburg to Kaliningrad. The cable project is at the stage that a permit application for marine surveys has been delivered to Embassy of Finland. The surveys in Finnish EEZ are to be performed during the years 2008 – 2009. The cable is planned to be constructed during the year 2010. According the plans the cable is to be buried through the whole distance of the route into the depth of 0.9 – 1.2 m. The cable route in Finnish EEZ is planned to be along the planned Nord Stream pipeline which might cause complications due to necessity for safety zones of both, cable and pipeline. Both parties have agreed to continue cooperation during the planning processes of these projects. /26/

The planned cables, except Estlink II, are shown in Atlas Map IN-F-1. There is no official route plan from Estlink II available at this stage. Note that Russian telecom cable is presented on basis of coordinate data. Helsinki – Tallinn – Hanko – Kökar – Stockholm telecom cable is presented on basis of digitized data which is not as accurate as coordinate data. For example the crossing points between this cable and the planned pipeline cannot be pointed out accurately from Atlas Map.

For Route C16, the crossings are the same, with the exception of the inactive cable Jollas - Leningrad. The cable crosses both of the planned pipelines three times on the Route C16, whereas it crosses pipelines along the Route C14 only once /299/.

5.6.7.3 Gas pipes

The two companies Gasum and Eesti Gaas are planning a pipeline connection, called the Balticconnector, across the middle of the Gulf of Finland between the Paldiski Peninsula in Estonia and Vuosaari or Inkoo in Finland. The companies have carried out a technical study and preliminary field investigations. They are also elaborating spatial plans and strategic environmental assessments together with the local authorities in territories the planned pipeline will cross. The project is currently in the environmental impact assessment (EIA) stage in Finland. The full-scale EIA for the offshore section of the pipeline is planned to be carried out at the end of 2009 at the earliest /27/.

The planned Balticconnector pipeline is indicated on Figure 5.101.

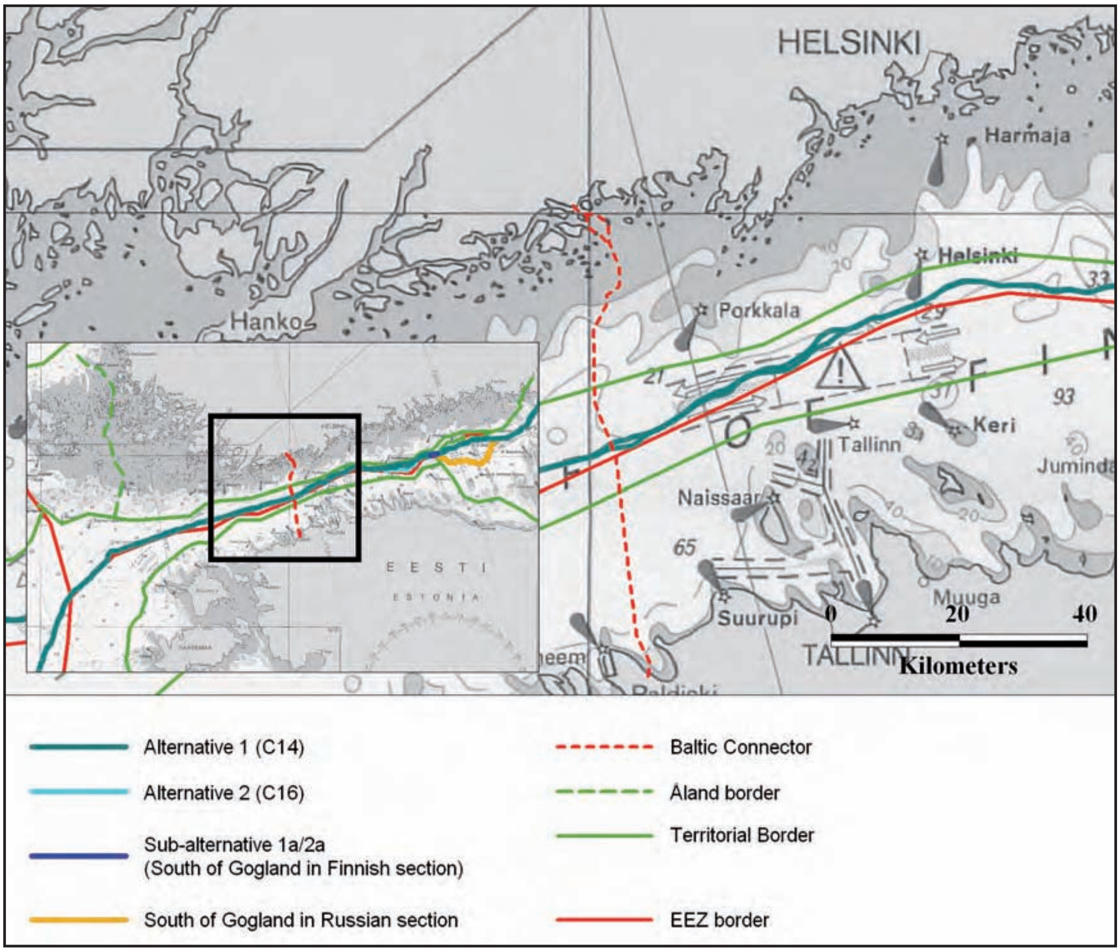

Figure 5.101. Preliminary route plan for Balticconnector gas pipeline between Finland and Estonia.

5.6.7.4 Wind parks

At present, there are no wind parks in Finnish territorial waters or in the Finnish EEZ. However, areas for wind parks are under investigation in Gulf of Finland, and Finnish authorities are making efforts to increase wind power resources because at present Finland does not fulfil its national climate strategy target concerning the use of wind power.

The Regional Councils of Finland are responsible for planning regional land-use and promoting local and regional interests in general. Regional planning is currently being prepared in four of the regions: Uusimaa, Eastern Uusimaa, Kymenlaakso and Southwest Finland.

The Uusimaa Region land-use plan includes offshore areas suitable for wind power plants. Preliminary studies have been carried out in eight potential areas, but only one area has been presented in the final land-use plan. The area is 20 km from the planned pipeline route. /300/

Eastern Uusimaa Region, in cooperation with the Regional Council of Kymenlaakso, commissioned a feasibility study of suitable on- and offshore wind power plants in coastal areas. Three potential areas in Eastern Uusimaa Region and five in Kymenlaakso Region were identified. The three areas in Eastern Uusimaa Region are all onshore areas and therefore are not relevant to the detailed assessment. In Kymenlaakso Region, only one of the five potential areas is offshore. Another offshore area was investigated but is not classified as potential at this stage without further studies. The closest studied area is 14 km from the planned pipeline route. The study provided baseline information for regional land-use planning in the two regions /301/.

The Region of Southwest Finland has prepared a study for regional land-use planning regarding wind power. In the first phase of the project the goal was to find potential areas for large wind parks. None were identified. In the second phase of the project, potential wind parks for three to 10 power units were identified. The third phase included a preliminary assessment of technical, economic and landscape impacts. As a result six potential wind park areas were identified for further planning. The closest studied area is 50 km from the planned pipeline route. /302/

The studied offshore wind park areas in these regions are shown in Atlas Map IN-3-F.

Hafmex Windforce Oy has untertaken an EU-funded project regarding development of offshore windmills in Finland, but considerations about the location and time schedule are at a very early stage. According to Hafmex Windforce, a wind park in close vicinity to the Nord Stream pipeline is not expected /303/.

As technology develops, wind power plants will become larger and more feasible in deeper water areas. At present, the most powerful offshore plants are about 5 MW, which can be constructed in water depth of 20 m. The implementation of large offshore wind power plants becomes profitable on banks farther from the coast, at least at distances greater than 10 km. /301/

The new innovation in the wind energy sector is floating wind power plants. Their greatest advantage is that they can be built in deeper sea areas further away from shores, where the wind is stronger and steadier. The problem with the usual plants is that building them in water depths beyond 20 m is prohibitively expensive. Studies indicate that floating wind parks could be built in areas where the water depth is from 80 m to more than 300 m – and they would still be economically profitable. Several companies in Europe and the United States are studying the subject and developing the technology /304, 305/.

5.6.7.5 Raw material extraction

Considerable sand and gravel resources are available in Finnish coastal waters, which in recent years have been surveyed and mapped by the Geological Survey of Finland with Morenia, a subsidiary company owned by the Finnish Forest Agency (Metsähallitus) as a cooperative party. The surveys have shown that the Gulf of Finland has usable sea sand and gravel formations, especially in the area between Kotka and Porkkala. In this area there are many ridges on land that were formed during the ice age, and according to data and acoustic-seismic surveys performed by the Geological Survey of Finland, these ridges continue along the sea bottom in the Gulf of Finland, stretching from Finnish territorial waters into the Finnish EEZ /300/.

Mussalo Harbour in Kotka was broadened using approximately 1 million m^3 of extracted marine sediments, and the new Vuosaari Harbour in Helsinki was constructed using 10 million m^3 of marine sediments extracted from the formations of Soratonttu and Itätonttu. Residential areas have also been constructed using marine sediments: The residential area of Ruoholahti in Helsinki was constructed using 1 million m^3 of marine sediments extracted from the Mustakupu area in the Gulf of Finland. So far, the offshore extraction of sediments has been carried out only within territorial waters /306/.

There is a increasing interest in sand and gravel formations in sea areas because there are already signs of deficiency of raw materials acquired from land. Another important factor is that in the coastal area of the Gulf of Finland, transport distances from land extraction areas are becoming too great, and it would be more efficient and profitable to transport raw material from offshore extraction areas. Therefore, in future, offshore formations will become an even more attractive route to extraction areas on land. /306/.

Designation of marine-sediment extraction areas in territorial waters is made by the Regional Planning Authorities during the regional planning procedure. Areas for marine-sediment extraction are expected to be designated in the next regional plans. At present, there is no planning in place for the EEZ because regional planning only covers the territorial areas /306/.

In Finland planning for marine sediment extraction is prepared by private companies. The permitting authorities for these plans are the three regional environmental permitting authorities in Finland. Prior to filing a permit application, the companies must conduct an EIA, which is subject to approval by the coordinating authority, i.e., a local Environment Centre. Raw material extraction is subject to a permit according the Water Act. /306/

According to the information received from the Western Finland Environmental Permit Authority, 11 permits for the extraction of raw material from the seabed were granted during the years 1991–2005. Five of these areas are situated on the south coast within territorial waters in Helsinki and Sipoo at a distance of 18 – 26 km from the planned pipeline route /28/.

The extraction areas for raw materials are shown in Atlas Map IN-3-F.

In Pernaja – Loviisa waters a permit has been granted for the extraction of 600,000 - 800,000 m3 over a period of 10 years. Extraction will take place only during the ice-free season from April to October (or possibly December depending on the weather). At present there is no certainty whether the area is in use simultaneously with the construction works of the planned pipeline. The planned off-loading areas for the extracted rock and sand material will be in Loviisa, Hamina and Kotka harbours /307/.

There is a claim for mining mineral extraction area south from Helsinki in Gulf of Finland that has been delivered to Finnish Ministry of Employment and the Economy. The area of claim is about 0.85 km^2. The 50 m wide area reaches to the Finnish EEZ border. It crosses also the planned pipeline route. The area is shown in Atlas Map IN-3-F. If the claim and possibly required survey permit application pursuant to Finnish Act on Exclusive Economic Zone get approval from Finnish authorities it will only give right to perform exploration works on the area. The survey permit according to the Mining Act and the Finnish Act on Exclusive Economic Zone does not interrupt other licensed or legal activities. The possible establishing of a mine would require EIA procedure, concession right according to the Mining Act and permits pursuant to at least Water Act, Environmental Protection Act and Finnish Act on Exclusive Economic Zone. Because of the present stage of the claim it is not relevant to assess possible impacts of the planned pipeline to the mining area mentioned. /29, 308-311/

5.6.8 Cultural heritage

5.6.8.1 Overview

Cultural heritage can largely be defined as the record of past and present human activity. Cultural heritage resources are finite and non-renewable; each site may contain information that is both unique and previously unknown. The maritime cultural heritage sites of the Baltic Sea as a whole are primarily related to shipwrecks and submerged Stone Age settlements. In the Finnish EEZ, cultural heritage is primarily comprised of shipwrecks.

The cultural heritage of the Baltic Sea must be viewed as an entity of its own and not related to borders or territorial waters. The shipwrecks and submerged settlements in the Baltic Sea represent the way people in the Baltic region and beyond have interacted through time. A shipwreck found within the waters of one country may have its origin in another, thus making it valuable to both countries.

Due to the national character of legislation in the Baltic States, information about shipwrecks and other cultural heritage sites has been gathered mainly within territorial waters. Knowledge of wrecks and other sites of cultural heritage outside territorial waters therefore is generally both random and minimal. Furthermore, the known underwater cultural heritage sites outside national territorial waters in the Baltic are poorly researched, because sites on land and in territorial waters have been given priority.

Following ratification of the UN Convention on the Law of the Sea (UNCLOS) during the last decade, however, this has begun to change. UNCLOS obliges states to protect and preserve archaeological and historical objects found in maritime areas outside national jurisdiction. Finland ratified UNCLOS in 1996 /312/.

Protection outside national marine zones is also addressed in the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage (although it has not yet been ratified by Finland) and in the Espoo Convention on Environmental Impact Assessment (EIA) in a Transboundary Context (1991), which has been ratified or signed by all Baltic countries, except Russia /312, 313/.

5.6.8.2 Cultural heritage in the Finnish project area

The Finnish Act on Archaeological Remains applies only to Finnish territorial waters. The Finnish National Board of Antiquities (FNBA), therefore, lacks exhaustive information on archaeological sites outside territorial waters. Archival research has been supplemented by extensive surveys to locate cultural heritage sites. Consequently a total of 18 potential cultural heritage sites have been identified within the Finnish project area (project area: installation and anchoring corridor of both routes, C14 and C16).

Shipwreck sites reflect a diverse group of vessels that vary in age, size and type. Some shipwrecks are of no archaeological interest, whereas others are unique for one reason or another. The integrity of shipwreck sites depends on a number of factors, in particular the manner, in which the vessel was wrecked, the conditions on the seabed and later disturbances.

Due to physical conditions in the Baltic Sea (low salt content, low species diversity, relatively low temperatures, low oxygen content, etc.), the decomposition of organic materials progresses slowly. Consequently, the preservation of organic materials is exceptional, even on an international scale. The preservation value and scientific potential of underwater cultural remains are therefore great. The fact that the underwater cultural environment has not been subject to much of the exploitation that has taken place on land only adds to the potential archaeological value of the underwater cultural remains in the Baltic Sea.

Once settled on the seabed, wrecks are prone to physical destruction by activities like trawling. Still, a shipwreck must not necessarily be fully intact to be of archaeological interest. Even some highly degraded shipwrecks can yield valuable information after thorough investigations of hull remains, equipment, cargo and other artefacts belonging to the wreck. It is therefore important to recognise that the ‘ancient monument area’ of a wreck site is not only the hull itself, but includes the total deposit and distribution area of remains from a broken wreck, which in many cases is substantially larger than the actual hull.

The FNBA lacks exhaustive information concerning the location of cultural and historical shipwrecks in Finland’s EEZ. However, the organisation has pointed out three known wreck sites within the anchoring and installation corridor of the planned pipeline route /314/.

- **Porkkala Open Sea Wreck:** 19th century, 45 m long, carvel-built sailing vessel. The wreck is comparatively intact, although broken over a cliff on the sea bottom. It has been surveyed by remotely operated underwater vehicle (ROV) by the Finnish Coastguard and a Finnish diving team (Jussi Kaasinen).

- **SS Andrei Zdanov (Open Sea Wreck, MUS1):** 20th century Russian passenger steamship, sinking year 1941. Subject has not been classified as an ancient monument. Wreck is approximately 95 m long, 14 m wide and rises 10 m from sea bottom. The wreck was located in 2005 by the Finnish Maritime Administration during a sidescan sonar (SSS) survey. Wreck was checked by a Finnish diving team (Jussi Kaasinen) in 2007.
- **Rusalka:** 19th century, 48 m long, ironclad vessel of the Imperial Baltic Sea Fleet built in 1868. The Rusalka sank in a storm (19 September 1893) whilst underway from Estonia to Finland. All crew and passengers (177 persons) were lost. The wreck is relatively intact. Half of it has sunk into the sea bottom.

In addition to the wrecks known to authorities, Nord Stream AG has performed extensive surveys for special bottom structures including wrecks using, e.g., sidescan sonar (SSS) and video inspection. The methods are described in Chapter 5.1. The data have been evaluated by national experts /315, 316/.

More information is provided in Atlas Map CU-1-F.

Route (C14)

All four sites are situated less than 50 m[1] from the route C14. These sites are:

- **Small sailing dinghy** (S-10-3237) – Well-preserved clinker-built dinghy of type well-known in Finland. Age cannot be determined precisely, as the vessel may be between 50 and 150 years old. The date of the wreck is unknown. Distance to pipeline: 0 m
- **Assemblage of brown objects** (S-07-2744) – Assessed by palaeontologist to be of natural historical origin (skeletal remains). Vertebrae are too large to be from a Pleistocene mammal, therefore possibly a whale skeleton. Distance to pipeline: 8 m
- **Wooden wreck** (S-W8A-10289) – Preliminary assessment by FNBA: more than 100 years old and of cultural heritage interest. Distance to pipeline: 25 m
- **Wooden ship wreck** (S-13-3526) – Preliminary assessment by FNBA: more than 100 years old. Distance to pipeline: 48 m

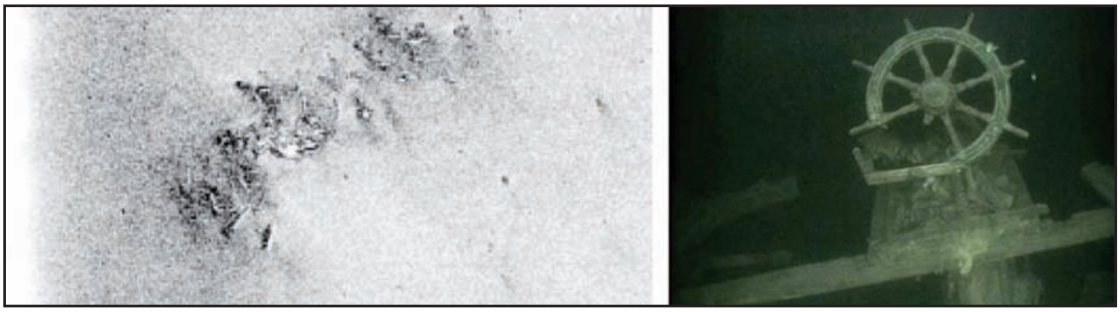

Figure 5.102. Left: sidescan image of target S-07-2744. Right: Still image of target S-13-3526.

1 All distances are given as the distance between the pipeline route and the centre coordinate of the target.

Within the zone 50-250 m from the pipeline (route C14) a total of seven wrecks or possible wrecks have been located:

- **Wooden sailing vessel** (S-05-2385) – Estimated building date 1880-1920. Date of sinking unknown, but likely more than 100 years ago. Considered to be of cultural historical interest.
- **Battleship** (S-07-2736 and FNBA reg. ID 2440) – Wreck of the Russian battleship Rusalka, sunk in 1893. The wreck is of cultural heritage interest.
- **Aeroplane** (S-08-2610) – Unidentified aeroplane. Possibly of eastern European origin and possibly from WWII or earlier. Not of interest to the FNBA, but possibly of interest to the Finnish Aviation Museum or Finnish Ministry of Defence.
- **Wooden sailing vessel** (S-11-3138) – Wreck of a typical coastal vessel from the 20th century. Many parts of the wreck are broken up.
- **Large battleship** (S-09-3025) – Wreck of a large battle ship. The wreck is believed to be the Russian destroyer Smetleyvi, sunk in November 1941 after hitting a mine. Falls under the legislation of the Finnish Ministry of Defence.
- **Modern wreck fragment** (S-14-3569) – Wreck remains of modern origin. Possibly buried wreck, but more likely just a fragment of wreck remains. The remains are not of cultural heritage interest.
- **Porkkala Open Sea Wreck** (FNBA reg. ID 2422) – Wreck of unidentified wooden sailing vessel, probably from 19th century.

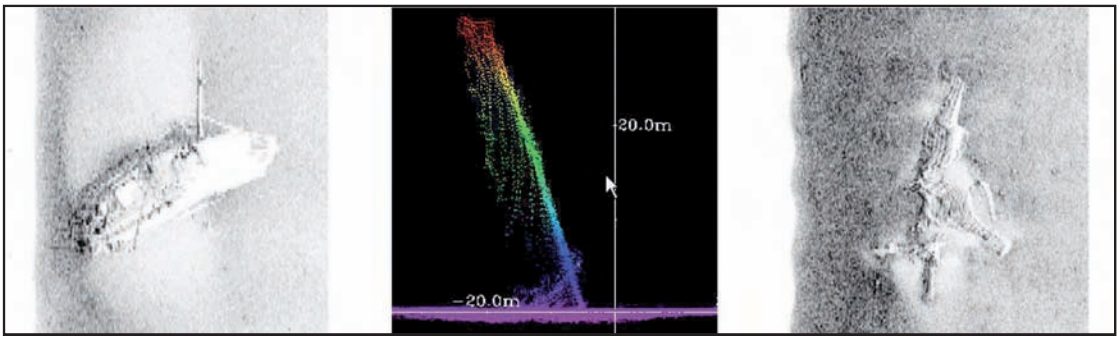

Figure 5.103. Left: Sidescan image of target S-05-2385. Middle: Multibeam sonar image of Rusalka, clearly indicating its near vertical position in the water column. Right: Sidescan image of target S-08-2610.

The following six wrecks or possible wrecks are situated more than 250 m away from the pipeline Route C14, but still within the anchoring zone:

- **Wooden sailing vessel** (S-08-2939) – Relatively intact wreck of a type most likely built in the middle or latter half of the 19th century. Contact mine situated close to starboard side. The wreck is considered to be of cultural heritage interest.
- **Possible wreck** (16-14) – SSS anomaly interpreted as a wreck. Visual inspection by ROV indicates that it could be a wreck, although the site is not fully understood. The site is assessed to be of cultural heritage interest.

- **MUS1** (FNBA reg. ID 2489) – Wreck of Russian steam passenger ship Andrei Zdanov, sunk in November 1941 after hitting a mine. Falls under the legislation of the Finnish Ministry of Defence.
- **Unidentified wreck** (1-10) – Wreck identified from SSS only. The archaeological significance of the wreck is not assessed.
- **Unidentified wreck** (4-9) – Wreck identified from SSS only. The archaeological significance of the wreck is not assessed.
- **Unidentified wreck** (3-9) – Wreck identified from SSS only. The archaeological significance of the wreck is not assessed.

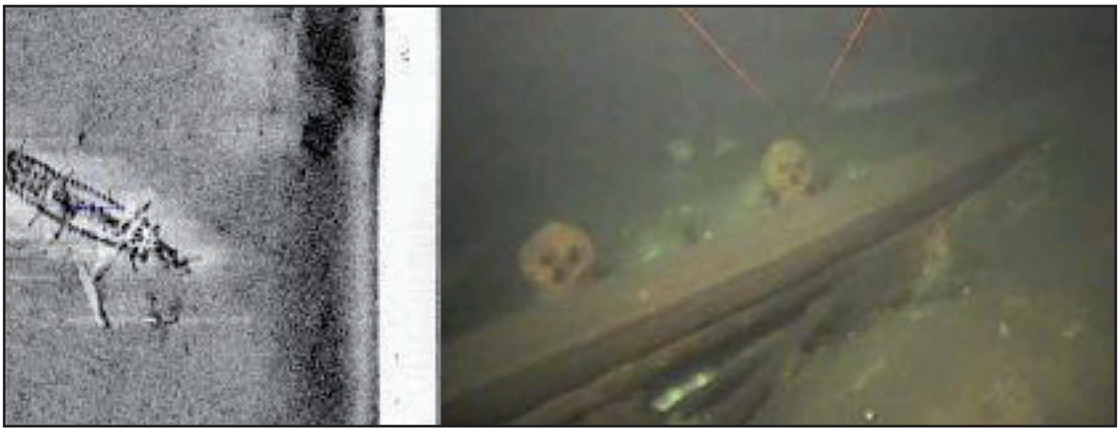

Figure 5.104. Images of wreck site S-08-2939 in Finnish EEZ discovered during survey. The dead eyes (part of the rigging) are still in place.

Route (C16)

The Route C14 and C16 deviate only along an approximately 40 km long stretch (Kalbådagrund). This stretch, which is part of Route C16, has been surveyed in 2008 and FNBA has made an assessment of the survey data /317/.

All wrecks listed under Route C14 are situated along a part of the route that is common to both Routes, C14 and C16. All wrecks listed under Route C14 above, therefore, are also relevant in relation to Route C16. In addition to these are any wrecks located during surveys of the 40 km.

During survey of the Route C16 and an adjacent area a WWII submarine was discovered. The submarine is situated at a distance of > 1,200 m off the pipeline route alternative. The wreck is thus not situated within the project area as it is outside the anchoring zone and will not be affected by the project. This wreck is therefore not described further in the text. However a small section of a wooden mast was located 14 m from the pipeline Route C16. The mast piece has been video documented thoroughly by ROV and has consequently been considered as dispensable by the FNBA /317/.

Similar to the route C 14, the presence of submerged Stone Age settlements is not an issue of concern along the route C16, as this area of the Baltic has been subject to upheaval and not submergence since the end of the glacial period.

Both routes, C14 and C16 are situated approximately 7.5 km from the protected area around the wreck site of the passenger ferry *Estonia* /318/. The protected area around the wreck site is indicated in Atlas Map CU-1-F.

Submerged settlements and landscapes in the Finnish EEZ

Since the last glacial period, the Baltic Sea has undergone major environmental changes. Global warming at the end of the last glacial period led to rising sea levels, which, combined with isostatic upheaval of land masses, caused great changes in the Baltic coastline /319/. The changes were neither uniform nor constant. Changing sea levels caused some former land areas to be submerged (particularly in the southern part of the Baltic Sea), thus also submerging human settlements, monuments and the landscapes around them. Within the Baltic Sea it is unlikely that there are any submerged settlements at latitudes north of approximately 55.5o-56o N, as these areas were not dry land during the Stone Age /320/. Therefore, submerged settlements are not relevant when assessing cultural heritage in the Finnish EEZ.